VOLUME 21 / NUMBER 3
FEBRUARY 8, 1983
ACC. NOS. N83-12038 TO N83-13058

Astronomy
TL
501
.S42
V.21
N03

The University
of Michigan
Astronomy
Library

MAR 24 1983

STAR
AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

10 84 291AA2 2 613 1 XL 3 2689

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, Engiand

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	– 1	– 2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 21 NUMBER 3/FEBRUARY 8, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) **319**

02 AERODYNAMICS **319**

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY **321**

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION **321**

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE **324**

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION **326**

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER **326**

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL **328**

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) **329**

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) **330**

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS **331**

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) **331**

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES **332**

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION **333**

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING **N.A.**

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE **333**

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION **N.A.**

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER **334**

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 335
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 338
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 340
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 344
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 348
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 349
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 352
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 356
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 361
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 364
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 370
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 373
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 376
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 378
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 378
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 383

43 EARTH RESOURCES 383
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 389
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 399
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 412
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 417
Includes weather forecasting and modification.

48 OCEANOGRAPHY 433
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **435**
Includes genetics.

52 AEROSPACE MEDICINE **436**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **436**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **438**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **438**

60 COMPUTER OPERATIONS AND HARDWARE **439**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering*.

61 COMPUTER PROGRAMMING AND SOFTWARE **440**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **445**
Includes computer networks.

63 CYBERNETICS **445**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support*.

64 NUMERICAL ANALYSIS **446**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **449**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **451**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **N.A.**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics: and thermodynamics and statistical physics.
For related information see also *Engineering*.

70 PHYSICS (GENERAL) **N.A.**
For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar Physics*.

71 ACOUSTICS **451**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution*.

72 ATOMIC AND MOLECULAR PHYSICS **453**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **455**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation*.

74 OPTICS **455**
Includes light phenomena.

75 PLASMA PHYSICS **456**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

76 SOLID-STATE PHYSICS **458**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers*.

77 THERMODYNAMICS AND STATISTICAL PHYSICS **N.A.**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer*.

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **460**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **460**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **461**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **N.A.**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **463**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **463**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **463**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **464**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **464**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **465**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

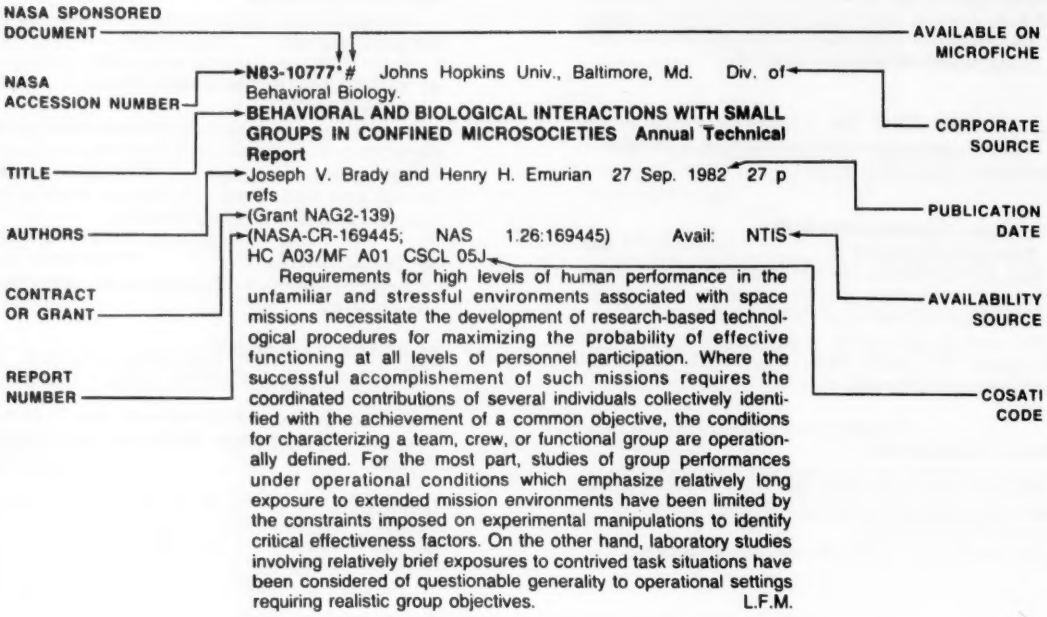
GENERAL

99 GENERAL **466**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-53**
CORPORATE SOURCE INDEX **I-61**
CONTRACT NUMBER INDEX **I-75**
REPORT / ACCESSION NUMBER INDEX **I-79**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777*# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J
AVAILABILITY SOURCE
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 3/FEBRUARY 8, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-12038* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY (SUPPLEMENT 152)
Sep. 1982 95 p
(NASA-SP-7037(152); NAS 1.21:7037(152)) Avail: NTIS HC $5.00 CSCL 01A

The bibliography lists 338 reports, articles and other documents introduced into the NASA scientific and technical information system in August 1982. Author

N83-12039# Federal Aviation Administration, Washington, D.C. Office of Management Systems.
CENSUS OF US CIVIL AIRCRAFT, CALENDAR YEAR 1981 Annual Report
31 Dec. 1981 252 p
(AD-A118571) Avail: NTIS HC A12/MF A01 CSCL 01/3

Information is provided on the U.S. civil aircraft fleet. Tables show the number and kinds of air carrier aircraft; registered aircraft are inventoried by manufacturer and model; and general aviation aircraft are listed by state and county of the owner. GRA

N83-12040# Operations Research, Inc., Silver Spring, Md.
AIRCRAFT FLIGHT PROCEDURE PROGRAM: DATA BASE DEVELOPMENT Final Report
Larry A. Ronk, T. A. Gates, and W. S. Wilkinson Mar. 1981 162 p refs
(Grant EPA-68-01-6151)
(PB82-183740; EPA/DF-82-003A; ORI-TR-1799) Avail: NTIS HC A08/MF A01 CSCL 01B

Performance and operational data and information required to construct flight paths and performance schedules for selected commercial aircarrier aircraft types powered by low-by-pass ratio and high-by-pass ratio turbofan engines was identified and collected. The performance and operational data and information can be used to determine the flight paths and performance schedules for aircraft operating accordance with specified flight procedures, and over a range of airport temperatures and airport pressure altitudes. In addition, an evaluation of available flight procedures computer programs developed by various organizations such as aircraft manufacturers, consultants, and the Federal government is included. The purpose of evaluating these programs was to identify existing analytical and computer programming work which can be used in developing a modified computer program model to generate aircraft flight path and performance schedule data which was compatible with the input data requirements of the FAA's integrated noise model and the USAF's model. GRA

N83-12041# Operations Research, Inc., Silver Spring, Md.
AIRCRAFT FLIGHT PROCEDURE PROGRAM: MODIFIED COMPUTER PROGRAM MODEL, USER'S MANUAL Final Report
Dec. 1981 85 p refs
(Grant EPA-68-01-6267)
(PB82-183757; EPA/DF-82-003B) Avail: NTIS HC A05/MF A01 CSCL 01B

An aircraft flight procedures model used to construct aircraft flight paths and performance schedules for specified operational procedures is described. The computer model algorithms were derived from fundamental aircraft and engine performance relationships or from operational characteristics applicable to specific aircraft types. The flight path and performance schedule data generated by the model are compatible with the input data requirements of the FAA's integrated noise and the USAF's model. The flight procedures model was developed and installed on a IBM 370/168MP computer system. The program was written in FORTRAN IV language and executed interactively. GRA

N83-12042# University Coll. of North Wales, Bangor.
STATIC ELECTRIFICATION: FUNDAMENTAL CONCEPTS, HAZARDS AND APPLICATIONS
D. M. Taylor, J. C. Gibbings, E. A. Baum, and N. Gibson 1981 170 p refs Lectures presented at Summer School on Static Electrification, Bangor, Wales, 1976
(PB82-183856) Avail: NTIS HC A08/MF A01 CSCL 20C

Aspects of static electrification are discussed. Author (GRA)

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-12043# National Aerospace Lab., Tokyo (Japan).
FLOW QUALITY OF NAL TWO-DIMENSIONAL TRANSONIC WIND TUNNEL. PART 1: MACH NUMBER DISTRIBUTIONS, FLOW ANGULARITIES AND PRELIMINARY STUDY OF SIDE WALL BOUNDARY LAYER SUCTION
Seizo Sakakibara, Kazuaki Takashima, Hitoshi Miwa, Yasuo Oguni, Mamoru Sato, and Hiroshi Kanda 1982 80 p refs In JAPANESE; ENGLISH summary
(NAL-TR-693; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

Experimental data on the flow quality of the National Aerospace Laboratory two dimensional transonic wind tunnel are presented. Mach number distributions on the test section axis show good uniformity which is characterised by the two-sigma(standard deviation) values of 0.0003 to 0.001 for a range of Mach numbers from 0.4 to 1.0. Flow angularities, which were measured by using a wing model with a symmetrical cross section, remained within 0.04 degree for Mach numbers from 0.2 to 0.8. Side wall boundary layer suction was applied through a pair of porous plates. The variation of aerodynamic properties of the model due to the suction mass flow rate change is presented with a brief discussion. Two

dimensionality of the flow over the wing span is expected to be improved by applying the appropriate suction rate, which depends on the Mach number, Reynolds number, and lift coefficient. M.G.

N83-12044*# Northrop Corp., Hawthorne, Calif. Aircraft Div.
EXPERIMENTAL INVESTIGATION OF TANGENTIAL BLOWING FOR CONTROL OF THE STRONG SHOCK BOUNDARY LAYER INTERACTION ON INLET RAMPS Final Report
Myles F. Schwendemann Jun. 1981 186 p ref
(Contract NAS2-9281)
(NASA-CR-165390; NAS 1.26:165390; NOR-81-127) Avail: NTIS HC A09/MF A01 CSCL 01A

A 0.165-scale isolated inlet model was tested in the NASA Lewis Research Center 8-ft by 6-ft Supersonic Wind Tunnel. Ramp boundary layer control was provided by tangential blowing from a row of holes in an aft-facing step set into the ramp surface. Testing was performed at Mach numbers from 1.36 to 1.96 using both cold and heated air in the blowing system. Stable inlet flow was achieved at all Mach numbers. Blowing hole geometry was found to be significant at 1.96M. Blowing air temperature was found to have only a small effect on system performance. High blowing levels were required at the most severe test conditions. Author

N83-12045*# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.
THREE DIMENSIONAL FLOW COMPUTATIONS IN A TURBINE SCROLL
A. Hamed and C. Abou Ghantous Aug. 1982 57 p refs
(Grant NAG3-52)
(NASA-CR-168003; NAS 1.26:168003) Avail: NTIS HC A04/MF A01 CSCL 01A

The compressible three dimensional inviscid flow in the scroll and vaneless nozzle of radial inflow turbines is analyzed. A FORTRAN computer program for the numerical solution of this complex flow field using the finite element method is presented. The program input consists of the mass flow rate and stagnation conditions at the scroll inlet and of the finite element discretization parameters and nodal coordinates. The output includes the pressure, Mach number and velocity magnitude and direction at all the nodal points. S.L.

N83-12046*# Ohio State Univ., Columbus. Dept. of Aeronautical and Astronautical Engineering.
AN INVESTIGATION OF THE AERODYNAMIC CHARACTERISTICS OF A NEW GENERAL AVIATION AIRFOIL IN FLIGHT Final Report, 1 May 1975 - 31 Aug. 1977
G. M. Gregorek, M. J. Hoffmann, and G. S. Weislogel Oct. 1982 57 p refs
(Contract NAS1-184)
(NASA-CR-169477; NAS 1.26:169477) Avail: NTIS HC A04/MF A01 CSCL 01A

A low speed airfoil, the GA(W)-2, - a 13% thickness to chord ratio airfoil was evaluated. The wing of a Beech Sundowner was modified at by adding balsa ribs and covered with aluminum skin, to alter the existing airfoil shape to that of the GA(W)-2 airfoil. The aircraft was flown in a flight test program that gathered wing surface pressures and wake data from which the lift drag, and pitching moment of the airfoil could be determined. After the base line performance of the airfoil was measured, the drag due to surface irregularities such as steps, rivets and surface waviness was determined. The potential reduction of drag through the use of surface coatings such as KAPTON was also investigated. S.L.

N83-12047*# Douglas Aircraft Co., Inc., Long Beach, Calif.
CALCULATION OF COMPRESSIBLE FLOW IN AND ABOUT THREE-DIMENSIONAL INLETS WITH AND WITHOUT AUXILIARY INLETS BY A HIGHER-ORDER PANEL METHOD Final Report
John L. Hess and Douglas M. Friedman Oct. 1982 89 p refs
(Contract NAS3-22147)
(NASA-CR-168009; NAS 1.26:168009; MDC-J2548) Avail: NTIS HC A05/MF A01 CSCL 01A

A three dimensional higher order panel method was specialized to the case of inlets with auxiliary inlets. The resulting program has a number of graphical input-output features to make it highly useful to the designer. The various aspects of the program are described instructions for its use are presented. S.L.

N83-12048*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN EXPERIMENTAL STUDY OF DYNAMIC STALL ON ADVANCED AIRFOIL SECTION. VOLUME 2: PRESSURE AND FORCE DATA
K. W. McAlister, S. L. Pucci, W. J. McCroskey, and L. W. Carr 22 Nov. 1982 646 p Prepared in cooperation with Army Aviation Research and Development command
(NASA-TM-84245-Vol-2; A-8925-Vol-2; NAS 1.15:84245-Vol-2; USAAVRADCOM-TR-82-A-8-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 01A

Experimentally derived force and moment data are presented for eight airfoil sections that were tested at fixed and varying incidence in a subsonic two dimensional stream. Airfoil incidence was varied through sinusoidal oscillations in pitch over a wide range of amplitude and frequency. The surface pressure distribution, as well as the lift, drag, and pitching moment derived therefrom, are displayed in a uniform fashion to delineate the static and dynamic characteristics of each airfoil both in and out of stall. S.L.

N83-12049*# Kentron International, Inc., Hampton, Va.
WIND-TUNNEL INVESTIGATION OF EFFECTS OF WING-LEADING-EDGE MODIFICATIONS ON THE HIGH ANGLE-OF-ATTACK CHARACTERISTICS OF A T-TAIL LOW-WING GENERAL-AVIATION AIRCRAFT Final Report
E. Richard White NASA Washington Nov. 1982 24 p refs
(Contract NAS1-16000)
(NASA-CR-3636; NAS 1.26:3636) Avail: NTIS HC A02/MF A01 CSCL 01A

Exploratory tests have been conducted in the NASA-Langley Research Center's 12-Foot Low-Speed wind Tunnel to evaluate the application of wing-leading-edge devices on the stall-departure and spin resistance characteristics of a 1/6-scale model of a T-tail general-aviation aircraft. The model was force tested with an internal strain-gauge balance to obtain aerodynamic data on the complete configuration and with a separate wing balance to obtain aerodynamic data on the outer portion of the wing. The addition of the outboard leading-edge droop eliminated the abrupt stall of the windtip and maintained or increased the resultant-force coefficient up to about alpha = 32 degrees. This change in slope of the resultant-force coefficient curve with angle of attack has been shown to be important for eliminating autorotation and for providing spin resistance. Author

N83-12050# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mathematics.
HEREDITARY MODELS FOR AIRFOILS IN UNSTEADY AERODYNAMICS, NUMERICAL APPROXIMATIONS AND PARAMETER ESTIMATION Final Report, 15 Dec. 1979 - 15 Mar. 1981
John A. Burns and Eugene M. Cliff Wright-Patterson AFB, Ohio AFWAL Feb. 1982 82 p refs
(Grant AF-AFOSR-0068-80; AF Proj. 2307)
(AD-A118446; VPI-E-81-18; AFWAL-TR-81-3173) Avail: NTIS HC A05/MF A01 CSCL 01/1

This report is concerned with the development of a general mathematical model for the motion of a two dimensional airfoil in unsteady aerodynamics and with the study of numerical schemes for estimating parameters in this model. The equations of motion are a set of coupled ordinary and functional differential equations. Approximating Wagner functions are used to construct state space models that retain the hereditary nature of unsteady fluid flow. The results of some simple numerical experiments are presented including a preliminary analysis of wind-tunnel data. Author (GRA)

N83-12051# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
ROTOR AERODYNAMICS IN GROUND EFFECT AT LOW ADVANCE RATIOS Final Report, 10 Sep. 1978 - 28 Feb. 1982

H. C. Curtiss, Jr., W. F. Putman, and E. J. Hanker, Jr. 27 Jul. 1982 163 p refs
(Contract DAAG29-80-K-0098; Grant DAAG29-78-G-0194)
(AD-A118609; MAE-1571; ARO-16061.2-EG) Avail: NTIS HC A08/MF A01 CSCL 20/4

The results of an experimental study of the aerodynamic characteristics of a helicopter rotor operating in ground effect at low advance ratios are presented. Flow visualization studies were conducted along with measurement of the forces and moments acting on the rotor as a function of advance ratio, height above ground and collective pitch. Steady state experiments as well as non-steady experiments involving translational acceleration were conducted. Three distinct flow regimes were noted from the flow visualization studies. At the low end of the advance ratio range a recirculating flow was present, at intermediate advance ratios a horseshoe shaped vorted formed under the rotor, and at the high end of the advance ratio range studied, the rotor wake flows entirely downstream. At test conditions were the recirculating flow or ground vortex is present there are marked departures from classical ground effect theory. Translational acceleration was found to have a significant effect on the rotor forces and moments indicating that some appreciable time is required for the establishment of the ground effect flow field when a recirculating flow or ground vortex exists in the steady state. The results indicate that magnitude of the ground effects experienced by a helicopter are sensitive to the flight path of the helicopter. Author (GRA)

N83-12052# McDonnell-Douglas Research Labs., St. Louis, Mo.
UNSTEADY TRANSONIC FLOW IN A TWO-DIMENSIONAL DIFFUSER Final Technical Report, 1 Apr. 1977 - 31 Mar. 1982
Miklos Sajben, Thomas J. Bogar, and Joseph C. Kroutil 31 Mar. 1982 23 p refs
(Contract F49620-77-C-0082; AF Proj. 2307)
(AD-A118473; MDC-Q0767; AFOSR-82-0622TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

Nominally two dimensional flows in two convergent-divergent diffuser models were investigated experimentally. The flows contained a normal shock downstream of the throat with pre-shock Mach numbers ranging to 1.4. Self-sustaining fluctuations occurred invariably and were closely investigated. Steady and fluctuating wall and midstream pressures were measured; high-speed schlieren photography was extensively employed. Shock displacement histories were measured with a line-scan camera technique. Author (GRA)

N83-12053# Air Force Academy, Colo. Dept. of Aeronautics.
MEASUREMENT OF WAKE INTERACTIONS OF A CANARD AND A FORWARD SWEPT WING
K. E. Griffin 6 Jul. 1982 101 p refs
(AD-A118756; USAFA-TN-82-4) Avail: NTIS HC A06/MF A01 CSCL 01/1

Experimental lifting surface wake data were taken from a canard/forward-swept wing reflecting plane wind tunnel model. The data include distributions of total, dynamic, and static pressures as well as cross velocity magnitudes and directions for an array of points around the model, both near the model and in its freestream wake. The model was tested as a body alone, as a wing/body combination, and as a wing/body/canard combination in order to compare wing wakes to wing/canard wakes. GRA

N83-12054# Tufts Univ., Medford, Mass. Dept. of Electrical Engineering.
POINTING PAYLOAD FOR SINGLE TETHER BALLOONS
Alvin H. Howell 26 Feb. 1982 106 p
(Contract F19628-80-C-0060; AF Proj. 7659)
(AD-A118770; SR-1; AFGL-TR-82-0076) Avail: NTIS HC A06/MF A01 CSCL 01/3

A general purpose, two-axis, pointing-type payload has been built for use in the tethered balloon program at Holloman AFB. It is capable of carrying an experiment having directional requirements, and weighing up to 100 pounds. When attached to the flying lines of an aerodynamically shaped balloon and held by a single tether, it will keep an axis within the payload pointed toward a target light on the ground in a daylight operation with a precision of + or - 0.75 degrees when elevated to 10,000 feet. Three modes of operation are possible, namely a stare mode, a search mode, and a pointing mode. In the stare mode the payload heading is set by commands from the ground, and the search feature permits an area surrounding the stare position to be scanned as a means of finding the target light. When the tracker finds the target the pointing axis in the payload will be continuously directed toward that target. Features were included which allow the payload to be readily carried on the tines of a forklift during the launch operation. Only a single additional step is needed in the regularly used launch procedure, that being to arrest the let-up, anchor the system in a particular way, insert the payload, and continue the let-up in the normal way. Capability of the system was demonstrated in a successful test at Holloman in September 1981 while carrying a hitchhike experiment that measured IR transmissions through the atmosphere. Author (GRA)

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-12055# Federal Aviation Administration, Washington, D.C. Office of Aviation Safety.
SUMMARY OF FEDERAL AVIATION ADMINISTRATION RESPONSES TO NATIONAL TRANSPORTATION SAFETY BOARD SAFETY RECOMMENDATIONS Quarterly Report, Jan. - Mar. 1982
J. H. MacKinnon and C. A. Carpenter Jan. 1982 148 p
(AD-A118692; FAA-ASF-300-82-2) Avail: NTIS HC A07/MF A01 CSCL 05/8

This report contains NTSB (National Transportation Safety Board) recommendations and all FAA (Federal Aviation Administration) responses to Board recommendations that were delivered to the Board during the applicable quarter. In addition, the report includes NTSB requests and FAA responses concerning reconsiderations, status reports, and followup actions. GRA

N83-12056# Textron Bell Helicopter, Fort Worth, Tex.
SLACK WIRE STRIKE PROTECTION CONCEPTS Final Report, Sep. 1981 - May 1982
Jul. 1982 72 p
(Contract DAAK51-81-C-0034; DA Proj. 1L1-62209-AH-76)
(AD-A118827; USAAVRADCOM-TR-82-D-9) Avail: NTIS HC A04/MF A01 CSCL 13/9

A design study has been conducted to establish slack wire strike protection concepts. The objective of the study was to define and investigate design concepts that could prevent helicopter mishaps caused by main and tail rotor controls entanglement with a slack wire. The study helicopter was an OH-58A equipped with a taut wire strike protection system (WSPS). Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-12057# Aeronautical Research Labs., Melbourne (Australia).
HAZARDS OF COLOUR CODING IN VISUAL APPROACH SLOPE INDICATORS
B. A. J. Clark and J. E. Gordon Dec. 1981 26 p refs

(ARL-Sys-Report-25; AR-002-324) Avail: NTIS HC A03/MF A01

Red-White visual approach slope indicators (VASIS) and PAPI both use color differences between red and white lights as the primary means of coding the guidance signals. Australia's T-VASIS uses color coding only as a secondary separate warning of extreme undershoot. The historical development of signal coding in VASIs is described. Color coding is examined with reference to human color discrimination ability and the degradation and falsification of VASI signals by atmospheric and other influences. There are several ways (not rare) in which the perceived color differences between red and white VASI signals can become small enough for the coding to be regarded as failed. The signals may then be misinterpreted, resulting in a 'too low' signal being taken as 'too high' with consequent great danger of an undershoot accident. Color coding of VASI primary signals therefore fails unsafe and VASIs which use it, such as Red-White VASIS and PAPI, should not be used. A.R.H.

N83-12058# Federal Aviation Administration, Atlantic City, N.J.
PRELIMINARY EVALUATION OF THE BASIC EXPERIMENTAL ACTIVE BEACON COLLISION AVOIDANCE SYSTEM (BCAS) Final Report
Edward Quish and Edward F. Glowacki Mar. 1982 97 p
(DOT/FAA-RD-82-67; CT-82-100-39LR) Avail: NTIS HC A05/MF A01

This data report provides information on the testing of a basic Active Beacon Collision Avoidance System (ABCAS). The system tests were initiated in February of 1980 and were conducted in a test-evaluate-design improvement iterative process. As a result, the data in this report generally is restricted to tests which were conducted after July 13, 1980. This date is considered the point at which the design of the tracking and threat evaluation and resolution software was frozen. The flight program consisted of conducting planned encounters and operational familiarization flights in terminal areas. Two hundred and twenty-five (225) hours of instrumented flight were conducted which included 255 planned encounters and 131 operational and demonstration landings and approaches into 18 major cities. During the test period following July 13, 114 hours of instrumented flight were conducted which included 110 planned encounters and all of the operational and demonstration landings and approaches. During this period of instrumented flight, 23 unplanned encounters were experienced with random targets. Initial evaluations were performed on target acquisition range, computer utilization, track continuity, and advisory verification and appropriateness of planned and unplanned encounters. Author

N83-12059# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
FLIGHT TEST INVESTIGATION OF AREA CALIBRATED LORAN-C FOR EN ROUTE NAVIGATION IN THE GULF OF MEXICO Final Report, Jul. 1980
John G. Morrow Washington Sep. 1982 53 p
(FAA Proj. 045-390-130)
(FAA-RD-82-7; FAA-CT-81-72) Avail: NTIS HC A04/MF A01

Flight tests of two Loran-C airborne navigators were conducted in the Gulf of Mexico oil/gas exploration and production area. Two systems were installed in a Federal Aviation Administration (FAA) CV-580 aircraft to examine simultaneously the performance of a LORAN-C receiver operated in an area-calibrated mode and one operated in an uncalibrated model. Two separate test routes were flown over a period of 2 days. These routes covered the central and western test areas of the Gulf of Mexico and an overland route from Palacios, Texas, to Lafayette, Louisiana. An Inertial Navigation System (INS) was used as a position reference standard. The INS data were updated to correct for drift. The flight tests indicated that the use of area calibration greatly increased the area of compliance with Advisory Circular 90-45A en route accuracy requirements in the flight test. B.W.

N83-12060# Federal Aviation Administration, Atlantic City, N.J.
COAST TERMINAL RADAR APPROACH CONTROL FACILITY (TRACON) REFURBISHMENT Final Report, Mar. - Jul. 1981
Donald Bottomley and Felix F. Hierbaum, Jr. Aug. 1982 32 p
(Contract FAA-144-170-830)
(DOT/FAA-RD-82-38; DOT/FAA-CT-82-21) Avail: NTIS HC A03/MF A01

This study was conducted as a result of the Western Region's decision to change the Coast Terminal Radar Approach Control Facility (TRACON) layout from a horizontal radar island-type operation to a vertical radar perimeter-type operation. This change was brought about by a Federal Aviation Administration (FAA) decision to add terminal control advisory service to the Coast TRACON functions. In addition, the present lighting system used at the coast TRACON produced undesirable reflections and glare. Several equipment configurations were proposed by facility and Western Region office personnel as well as by the FAA Technical Center personnel. These proposals were evaluated by Coast TRACON and Western Region office personnel. The governing factors were available space, cost, and impact on facility operations. The preferred configuration, provided additional space by recessing one row of consoles within the wall which divides the TRACON operational and maintenance areas. Experiments with various lighting techniques produced more useable ambient light while it reduced glare and reflections. B.W.

N83-12061# Systems Control Technology, Inc., West Palm Beach, Fla.
INSTRUMENT APPROACH AIDS FOR HELICOPTERS Final Report, Jan. 1981 - Jan. 1982
Edwin D. McConkey and Ronald E. Ace Washington FAA Jul. 1982 94 p refs
(Contract DTFA01-80-C-10080)
(FAA-RD-82-6) Avail: NTIS HC A05/MF A01

The various instrument approach procedures that are available to the helicopter operator are identified. Emphasis is placed on the recently approved 'Helicopter Only' procedures, the criteria for which are contained in Chapter 11 of the Terminal Instrument Procedures Handbook. Currently available solutions to helicopter approach needs are examined. New and innovative solutions to helicopter approach requirements are presented. B.W.

N83-12062# Federal Aviation Administration, Atlantic City, N.J.
OMEGA DATA BANK REPORT (SPRING THROUGH FALL, 1980)
Theodore J. Turnock and Lorraine I. Rzonca Aug. 1982 38 p refs
(Contract FAA-043-311-520)
(DOT/FAA-CT-82-5) Avail: NTIS HC A03/MF A01

Operationally usable signals corresponded quite well with the Omega signal coverage prediction diagram published by the Omega Navigation System Operational Detail (ONSOD). Exceptions were noted near Ellesmere Island for the La Reunion signal, and the continental U.S. for the Argentina signal for the specific months and times of the data flights. Several operational differences were noted between two different Omega sets flown side by side in an FAA aircraft during flights in South America and the South Atlantic. Nonetheless, for both sets, Omega positions are within 2 nautical miles of the Inertial Navigation System position (95 percent probability) during normal flight conditions. Author

N83-12063# Federal Aviation Administration, Atlantic City, N.J.
AIRPORT SURFACE DETECTION EQUIPMENT (ASDE)-3 IMPROVEMENTS TEST AND EVALUATION Final Report, Oct. 1980 - Oct. 1981
Louis A. Dvorsky and John F. Marsden Aug. 1982 26 p refs
(DOT/FAA-RD-82-23; DOT/FAA-CT-82-39; ACT-100) Avail: NTIS HC A03/MF A01

Anomalous elongation of target returns from F-106 aircraft; an oversized waveguide installed in lieu of standard K micron waveguide; and linear vertical, linear horizontal, and right hand circular antenna feed polarizations with respect to clear weather target imaging performance were evaluated. The target elongation is generated by intermediate frequency (IF) amplifier saturation. Oversize waveguide improves system performance and should be utilized for long radiofrequency (RF) runs. Linear polarization

improves clear weather target imaging and should be provided to the controller as an option. Author

N83-12064# Comsis Corp., Mountain View, Calif.
ARTS 2A DESIGN ANALYSIS Final Report, May 1981 - Jun. 1982
M. Tashker, M. Bell, and W. Chapel Washington FAA Jun. 1982 99 p Prepared in cooperation with SRI International Corp., Menlo Park, Calif.
(Contracts DTFA01-81-Y-10526; SB9-448(a)81-C-480)
(FAA-RD-82-54; CMSS-MV-82-01) Avail: NTIS HC A05/MF A01

The design for the ARTS 2A air traffic system for terminal areas with low to medium traffic density is documented. ARTS 2 is upgraded to ARTS 2A with the replacement of the LSI 2/20 minicomputer by the LSI 2/40, which is faster and has more memory capacity, and the addition of minimum safe altitude warning, conflict alert, a tracker to support these, and a training target generator. The use of semiconductor memory in an air traffic system and the requirement for a battery backup power supply is addressed. The algorithms for the enhancements were studied to determine whether the LSI 2/40 has sufficient speed to perform them under traffic and display loads expected in 1990. It is concluded that the replacement computer has the capacity to perform the enhancement functions under maximum target and display load for the expected air traffic environment. S.L.

N83-12065# Systems Control Technology, Inc., West Palm Beach, Fla.
THE 30 LORAN-C NAVIGATOR DOCUMENTATION Final Report, May 1981 - Jan. 1982
Eric H. Bolz and Larry D. King Jan. 1982 61 p refs
(Contract FA01-80-C-10080)
(DOT/FAA-RD-82-16) Avail: NTIS HC A04/MF A01

A 3D LORAN-C Navigator was developed by configuring an interface unit between an airborne LORAN-C navigator (Teledyne TDL-711) and an Altitude Alerter/VNAV Guidance system (Intercontinental Dynamics model 541). The digital computer-based interface unit was designed to allow the flight crew to specify the approach slope (3.0 to 9.9 degrees). The hardware and software in the interface unit, and interconnection with the other involved systems are documented. The availability of accurate, three-dimensional approach guidance information at airports where no ILS is available provides significant operational advantages, to helicopter operators in particular. The 3D LORAN-C navigator system was bench tested and flight demonstrated. Smooth, accurate (within the limitations of LORAN-C) descent guidance information was obtained. Author

N83-12066# Lincoln Lab., Mass. Inst. of Tech., Lexington.
TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS 1) DESIGN GUIDELINES Final Report
V. A. Orlando, J. D. Welch, W. H. Harman, and A. R. Paradis Washington FAA Apr. 1982 92 p refs
(Contracts DOT-FA72WAI-877; F19628-80-C-0002)
(ATC-114; FAA-RD-82-12) Avail: NTIS HC A05/MF A01

The FAA airborne Traffic Alert and Collision Avoidance System known as TCAS 1 is described. Simple techniques suitable for the passive and active detection of nearby aircraft by TCAS 1 were investigated. This is followed by a review of the measurement facilities and data used to evaluate the detection techniques. Techniques for identifying passively detected returns from potentially threatening aircraft, i.e., the rejection or filtering out of non-threat aircraft, are described and evaluated. Alternatives for time-sharing the 1090 MHz channel between the TCAS 1 transponder and the passive detector are described. A candidate passive detector is defined and its performance is evaluated using flight test data. Predictions of the performance of a low-power TCAS 1 based on active detection are made via link calculations and flight test measurements. A summary of results is included. Author

N83-12067# Lincoln Lab., Mass. Inst. of Tech., Lexington.
TCAS 1 DESIGN GUIDELINES
Vincent A. Orlando, Jerry D. Welch, W. H. Harman, and Albert R. Paradis 24 Sep. 1982 91 p refs
(Contracts F19628-80-C-0002; DOT-FA72WAI-877)
(ATC-114; FAA-RD-82-12) Avail: NTIS HC A05/MF A01

The FAA airborne Traffic Alert Collision Avoidance System known as TCAS 1 is described. Simple techniques suitable for the passive and active detection of nearby aircraft by TCAS 1 were investigated. The measurement facilities and data used to evaluate the detection techniques are reviewed. Techniques for identifying passively detected returns from potentially threatening aircraft, i.e., the rejection or filtering out of non-threat aircraft, are described and evaluated. Alternatives for time-sharing the 1090 MHz channel between the TCAS 1 transponder and the passive detector are described. A candidate passive detector is defined and its performance is evaluated using flight test data. Predictions of the performance of a low-power TCAS 1 based on active detection are made via link calculations and flight test measurements. A summary of results is included. Author

N83-12068# Systems Control Technology, Inc., West Palm Beach, Fla.
APPLICATION OF THE MICROWAVE LANDING SYSTEM TO HELICOPTER OPERATIONS Final Report
Edwin D. McConkey, John B. McKinley, and Ronald E. Ace Sep. 1982 125 p refs
(Contract DTFA01-80-C-10080)
(FAA-RD-82-40) Avail: NTIS HC A06/MF A01

Ways in which the microwave landing system (MLS) can be utilized to aid helicopter operations are identified. The following areas are examined: (1) helicopter instrument approach requirements by type of operation; (2) helicopter instrument approach requirements by operational area; (3) types of potential approach procedures that could be used by helicopers; (4) helicopter performance considerations during approach, landing and missed approach procedures; (5) ground and airborne MLS equipment; and (6) benefits and costs associated with the use of MLS in helicopter operations. The operational areas considered include: city centers, major hub airports, non-hub airports, remote areas, and offshore oil rig support. MLS procedures can be applied to each of these operational areas. From an economic standpoint, operations at city center heliports, major hub airports, non-hub airports, and remote areas can have benefits that exceed costs if operations counts are sufficiently large. Offshore operations will not have benefits that exceed costs due to the availability of alternative approach procedures. A.R.H.

N83-12069# H. H. Aerospace Design Co., Inc., Bedford, Mass.
A TECHNICAL ANALYSIS OF REHOSTING THE NATIONAL AEROSPACE SYSTEM SOFTWARE Final Report, Nov. 1980 - Aug. 1981
K. Britting, A. Cocanower, A. Gupta, M. Hsu, and F. Marcus Oct. 1981 162 p refs
(Contract DTFA01-80-Y-10595)
(AD-A118828; HHA-81-4; FAA-AP-82-2) Avail: NTIS HC A08/MF A01 CSCL 09/2

The Federal Aviation Administration (FAA) is planning to replace within the next ten years the computers used to provide en route air traffic control services; in carrying out this replacement there are many different strategies the FAA could follow. The purpose of this report is to study the strategy known as rehosting the National Airspace System (NAS) software on instruction-compatible machines. The idea is that the current computers (and associated peripherals) would be replaced by modern hardware that executes the same machine-language instructions. The current NAS software would be changed only insofar as proves necessary for the software to run on the new machines; these changes to the software are expected to be minor. The rehosting strategy is evaluated in seven areas. First, how reliable is the system? Second, how well will the system perform under expected workloads? Third, how serious are the technical obstacles to adapting the software to run on the new machines? Fourth, what would the new system cost? Fifth, what problems would be encountered during the transition to the new system. Sixth, how quickly could the system be procured? Seventh, how well adapted is the system to future growth. The conclusion is that the rehost strategy is technically

feasible, but there is some uncertainty about what this strategy would cost and how long the procurement process would take.
Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.
For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-12070*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
APPLICATION OF ZIMMERMAN FLUTTER-MARGIN CRITERION TO A WIND TUNNEL MODEL
Robert M. Bennett Nov. 1982 30 p refs
(NASA-TM-84545; L-15508; NAS 1.15:84545) Avail: NTIS HC A03/MF A01 CSCL 01C

The Zimmerman flutter margin criterion was studied by applying it to data obtained from a wind tunnel model. The sensitivity of the flutter margin parameter was explored with a parametric trend study and by calculation of the derivatives with respect to the input frequency and damping parameters. The criterion is simple in concept and application, and it serves as a good flutter onset predictor because it gives a nearly linear variation with dynamic pressure. However, accurate values of both frequency and damping of both modes involved in flutter are required for reliable flutter onset prediction. The simplified version using only frequencies gave a highly nonconservative flutter onset in one case and should not be used in general. M.G.

N83-12071*# Sikorsky Aircraft, Stratford, Conn.
FLIGHT SERVICE EVALUATION OF COMPOSITE HELICOPTER COMPONENTS Annual Report, Mar. 1981 - Apr. 1981
Melvin J. Rich and David W. Lowry Jun. 1982 101 p refs
(Contract NAS1-16542)
(NASA-CR-165952; NAS 1.26:165952; SER-510089; AR-1) Avail: NTIS HC A06/MF A01 CSCL 01C

This first interim report presents the technical background for including environmental effects in the design of helicopter composite structures, and test results after approximately two year field exposure of components and panels. Composite structural components were removed from Sikorsky S-76 helicopters commercially operated in the Gulf Coast region of Louisiana. Fatigue tests were conducted for a graphite/epoxy tail rotor spar and static test for a graphite/epoxy and Kevlar/epoxy stabilizer. Graphite/epoxy and Kevlar/epoxy panels are being exposed to the outdoor environment in Stratford, Connecticut and West Palm Beach, Florida. For this reporting period the two year panels were returned, moisture measurements taken, and strength tests conducted. Results are compared with initial type certificate strengths for components and with initial laboratory coupon tests for the exposed panels. Comparisons are also presented with predicted and measured moisture contents. Author

N83-12072*# Cessna Aircraft Co., Wichita, Kans. Advanced Design.
APPLICATION OF ADVANCED TECHNOLOGIES TO SMALL, SHORT-HAUL TRANSPORT AIRCRAFT (STAT) Final Report
E. F. Kraus, O. D. Mall, R. W. Awker, and J. W. Scholl Nov. 1982 125 p refs
(Contract NAS2-10263)
(NASA-CR-152362; NAS 1.26:152362; ADR-1164) Avail: NTIS HC A06/MF A01 CSCL 01C

The benefits of selected advanced technologies for 19 and 30 passenger, short-haul aircraft were identified. Advanced technologies were investigated in four areas: aerodynamics, propulsion, structures, and ride quality. Configuration sensitivity studies were conducted to show design tradeoffs associated with passenger capacity, cabin comfort level, and design field length.
Author

N83-12073*# Boeing Commercial Airplane Co., Seattle, Wash.
DEVELOPMENT OF INTEGRATED PROGRAMS FOR AEROSPACE-VEHICLE DESIGN (IPAD): INTEGRATED INFORMATION PROCESSING REQUIREMENTS
J. W. Southall Washington NASA Mar. 1979 177 p refs
(Contract NAS1-14700)
(NASA-CR-2984; NAS 1.26:2984; D6-IPAD-70012-D) Avail: NTIS HC A09/MF A01 CSCL 01C

The engineering-specified requirements for integrated information processing by means of the Integrated Programs for Aerospace-Vehicle Design (IPAD) system are presented. A data model is described and is based on the design process of a typical aerospace vehicle. General data management requirements are specified for data storage, retrieval, generation, communication, and maintenance. Information management requirements are specified for a two-component data model. In the general portion, data sets are managed as entities, and in the specific portion, data elements and the relationships between elements are managed by the system, allowing user access to individual elements for the purpose of query. Computer program management requirements are specified for support of a computer program library, control of computer programs, and installation of computer programs into IPAD. Author

N83-12074# Tactical Air Command, Langley AFB, Va.
F-106 TOW SYSTEM (IOT&E)
Apr. 1982 6 p
(USASADWC Proj. 82C-185A)
(AD-A118527) Avail: NTIS HC A02/MF A01 CSCL 01/3

The impending deactivation of the F-101 fleet at Tyndall AFB will require an alternate means of providing gun tow target capability at the USAFADWC. The tow capabilities of the F-106 should be investigated as a method of meeting these requirements. The RM-60 tow system was originally considered for use on the F-106. The RM-60 is a two-way tow system developed to support the target requirements of the US Army Division Air Defense System (DIVADS) program. It has been tested by the New Mexico Air National Guard (NMANG) and found to be compatible with the A-7D aircraft. In the current configuration; however, the RM-60 is not compatible with F-106 aircraft pylon. The development of a smaller, improved version of the RM-60, designated the RM-30, may solve the F-106 compatibility problems. Additionally, current assets of the A/A 37U-15 (DART) tow reels may be useful in providing an interim tow capability for F-106 aircraft. Both the RM-30 and A/A 37U-15 tow reels can carry and tow the Low Cost Tow Target (LCTT) to fulfill the gun tow target requirement at the USAFADWC. Author (GRA)

N83-12075# Army Aviation Engineering Flight Activity, Edwards AFB, Calif. Directorate for Development and Qualification.
AIRWORTHINESS AND FLIGHT CHARACTERISTICS TEST. PART 1: YAH-64 ADVANCED ATTACK HELICOPTER Final Report, 30 May - 17 Jul. 1981
Gary L. Bender, Larry B. Higgins, Richard Savage, John D. Ottomeyer, Bartholomew D. Picasso, III, and Patrick M. Morris Sep. 1981 181 p refs
(AD-A118490; USAAEFA-80-17-1) Avail: NTIS HC A09/MF A01 CSCL 01/3

The Airworthiness and Flight Characteristics Test Part 1 of the prototype YAH-64 helicopter (S/N 77-23258) was conducted at three test sites; Palomar Airport, Carlsbad, California (elevation 328 ft). Bishop Airport, Bishop, California (elevation 4120 ft), and Coyote Flats, California (elevation 9980 ft). Approximately 32 productive hours were flown during 45 flights between 30 May and 17 July 1981. Several design changes affecting performance and handling qualities were made to the YAH-64 since the last evaluation (EDT 4) the most significant of which were the changes in tail rotor rigging, the addition of a third DC electrical bus and the incorporation of a Nap-of-the-Earth/Approach mode of operation for the horizontal stabilator. Level flight performances and vibration levels have been slightly degraded since EDT 4, while handling qualities and out-of-ground-effect hover performance remain essentially the same. Numerous anomalies in the operation

of the Digital Automatic Stabilization Equipment (DASE) were experienced which may render some of the handling qualities test results suspect. Two deficiencies (both DASE related) were found during this evaluation. Yaw SAS hardovers, and disengagement of the DASE with failure of the No.2 generator. Nine previously unreported shortcomings (4 DASE related) were found.
Author (GRA)

N83-12076# Northrop Corp., Hawthorne, Calif. Aircraft Div.
EVALUATION OF A DAMAGE ACCUMULATION MONITORING SYSTEM AS AN INDIVIDUAL AIRCRAFT TRACKING CONCEPT Final Report, 14 Nov. 1980 - 30 Sep. 1981
C. L. Guadagnino Wright-Patterson AFB, Ohio AFWAL May 1982 233 p refs
(Contract F33615-81-C-3204; AF Proj. 2401)
(AD-A118768; NOR-82-58; AFWAL-TR-82-3023) Avail: NTIS HC A10/MF A01 CSCL 01/3

The objective of this program was to study and evaluate the concept of using a damage accumulation monitoring system based on microprocessor technology for individual aircraft tracking (IAT) needed to satisfy the Force Management requirements of MIL-STD-1503A. The two major components of this study were: (1) the evaluation of selected output and input IAT parameters required to monitor the potential crack growth of each of two major classes of aircraft (Bomber/Transport and Fighter/Attack/Trainer aircraft), and (2) the definition of the microprocessor-based IAT system in terms of capabilities and requirements. A number of existing and planned IAT programs which were considered as typical for the two major classes of aircraft were studied to determine problem areas, to evolve advanced concepts, and to evaluate the output/input parametric requirements and the functional characteristics needed to satisfy IAT system goals. Several conceptual microprocessor based IAT systems and one existing microprocessor based IAT system capable of satisfying the requisite functional requirements were developed, studied, and described. In addition, the study was extended to examine the capability of microprocessor based IAT systems to satisfy in part or wholly, the load and environment spectra survey (L/ESS) functions. Several system concepts were developed and described. Author (GRA)

N83-12077# Rockwell International Corp., Los Angeles, Calif. North American Aircraft Operations.
IMPROVED METHODS FOR PREDICTING SPECTRUM LOADING EFFECTS. VOLUME 1: TECHNICAL SUMMARY Final Report, 16 Jan. 1979 - 30 Nov. 1981
James B. Chang, R. M. Hiyama, and M. Szamossi Wright-Patterson AFB, Ohio AFWAL Nov. 1981 217 p refs 2 Vol.
(Contract F33615-77-C-3121; AF Proj. 2401)
(AD-A118856; NA-81-234-Vol-1; AFWAL-TR-81-3092-Vol-1) Avail: NTIS HC A10/MF A01 CSCL 01/3

This report presents the technical details of improved methods for predicting the load interaction effects on crack growth under flight spectrum loading developed in a research effort sponsored by the USAF. These include the cycle-by-cycle crack-growth prediction method used in the detail design stage, the flight-by-flight crack-growth analysis method for individual aircraft tracking usage, and preliminary design trade-off studies. Results of the experimental verification program are also presented in this document. GRA

N83-12078# Rockwell International Corp., Los Angeles, Calif. North American Aircraft Operations.
IMPROVED METHODS FOR PREDICTING SPECTRUM LOADING EFFECTS. VOLUME 2: TEST DATA Final Report, 16 Jan. 1979 - 30 Nov. 1981
James B. Chang and Ko Wei Liu Wright-Patterson AFB, Ohio AFWAL Nov. 1981 249 p refs 2 Vol.
(Contract F33615-77-C-3121; AF Proj. 2401)
(AD-A118857; NA-81-234-Vol-2; AFWAL-TR-81-3092-Vol-2) Avail: NTIS HC A11/MF A01 CSCL 01/3

This report presents the random flight spectra crack-growth test data generated in the experimental verification program of a research effort which aimed to upgrade the crack-growth prediction technology required for implementation of the damage-tolerance control procedure throughout the life cycle of any weapon system. Fighter and transport baseline spectra used in the test program are also presented in this report. The objective of phase 3 of this program is to perform experimental testing in verifying the crack-growth methodology developed in phases 1 and 2. This volume contains tabulations and plots of test data generated during this experimental program. Data tabulations are presented for 41 random flight spectrum tests, including the fighter baseline spectrum tests, the fighter spectrum variation tests, and mission mix tests, as well as a transport baseline spectrum and its variation tests. In this volume, random flight spectrum tables used for the baseline tests and the mission mix tests are included. All test spectra used in the spectrum variation tests are not presented in this report, since they can easily be reconstructed from the baseline spectra. GRA

N83-12079# Intermountain Forest and Range Experiment Station, Ogden, Utah.
STATIC TESTING TO EVALUATE AIRTANKER DELIVERY PERFORMANCE
Aylmer D. Blakely, Charles W. George, and Gregg M. Johnson Feb. 1982 22 p refs
(PB82-179946; FSGTR/INT-78) Avail: NTIS HC A02/MF A01 CSCL 01C

Airtanker performance guides to predict fire retardant ground distribution patterns from drop heights up to 500 feet when dropped from a number of different airtankers were produced using a simulation program and static test data for each specific tank and gating system. A method for collecting static test data and the analysis used in the development of the airtanker performance guide are described. This is done so the performance of any existing airtanker can be compared to the performance of any other specific airtankers that have been static tested. GRA

N83-12080# Boeing Commercial Airplane Co., Seattle, Wash.
AIRCRAFT NOISE REDUCTION
Richard E. Russell and J. M. Streckenbach Oct. 1981 17 p Presented at the Intern. Symp. on Transportation Noise, Pretoria, 21-23 Oct. 1981 Prepared in cooperation with National Inst. for Transport and Road Research, Pretoria
(PB82-206095) Avail: NTIS HC A02/MF A01 CSCL 01C

A brief introduction of the Boeing commercial airliner family is followed by a discussion of the significant noise reduction accomplishments for turbine-powered aircraft from the 1950's to the 1980's, with projections of further benefits until the year 2000. Definition of the trades to be made between noise reduction and fuel economy, as well as technical problems yet unsolved, lead to a recognition that the greatest advances in aircraft noise reduction are past, and that significant research will be required in the future to lower noise floors that are presently inhibiting further progress. Emphasis is given to precautions that must be taken in the selection of meaningful fleet noise data to avoid costly and irreversible errors in airport and community planning. Author (GRA)

N83-12081# Association Aeronautique et Astronautique de France, Paris.
AERODYNAMICS ON A TRANSPORT AIRCRAFT TYPE WING-BODY MODE
V. Schmitt Nov. 1981 28 p refs In FRENCH; ENGLISH summary Presented at the 18th Colloq. D'Aerodyn. Appliquee, Poitiers, France, 18-20 Nov. 1981
(PB82-206855; AAAF-NT-81-22; ISSN-0243-0177) Avail: NTIS HC A03/MF A01 CSCL 01C

This study carried out at ONERA is based on the DFVLR-F4 wing-body combination. The 1/38 model is formed by a 9.5 aspect ratio transonic wing and an Airbus A 310 fuselage. The purpose of this paper is to survey the work done by ONERA. After a description of the F4 wing geometrical characteristics main experimental results obtained in the S2MA wind tunnel are discussed. Both wing-fuselage interferences and viscous effects, which are important on the wing due to a high rear loading, are investigated. In order to do that, 3D calculations are performed and an attempt is made to find their limitations. Author (GRA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-12082# Aeronautical Research Labs., Melbourne (Australia).
COMPUTER GRAPHIC PRESENTATION OF CONVENTIONAL COCKPIT INSTRUMENTS
H. A. Thelander and R. J. Rossa Nov. 1981 32 p refs
(ARL-Sys-Note-82; AR-002-320) Avail: NTIS HC A03/MF A01

Conventional aircraft cockpit instruments, presented on a computer generated color display, are discussed in the context of research flight simulation, and their general characteristics in this application are established. The hardware and software involved in a realization of a simulator cockpit instrument panel using this approach is described, and the significant problem areas and solutions achieved are highlighted. Two of the more interesting instrument are discussed to illustrate the methods. Analysis of subjective assessments and timing measurements confirms the success of the work. Author

N83-12083# Embry-Riddle Aeronautical Univ., Daytona Beach, Fla.
EVALUATING THE USE OF ELECTRONIC FLIGHT INSTRUMENT SYSTEMS IN GENERAL AVIATION AIRCRAFT Final Report
J. B. Shelnutt, J. M. Childs, W. W. Prophet, J. P. Smith, and B. Strauch 15 Nov. 1982 231 p refs Prepared in cooperation with Seville, Research Corp., Pensacola, Fla.
(Contract DOT-FA-79NA-6040)
(AD-A118604; DOT/FAA-CT-82-73; DOT/FAA-EM-82-14) Avail: NTIS HC A11/MF A01 CSCL 01/4

Several avionics manufacturers announced plans to produce electronic flight instrument systems (EPIS) for general aviation aircraft. A two phased research program devoted to planning and conducting exploratory evaluations that will assess the ability of general aviation pilots to operate EFIS equipped aircraft was investigated. The results of the first phase of this project. The objectives of this phase were to determine the specific goals of the exploratory evaluations and to develop general guidance--i.e., a conceptual approach--for their conduct. The conceptual approach is described in terms of (1) the information needed from the planned evaluations; (2) the general design of the overall study; (3) requirements for the performance measurement systems that would be employed to collect data and for the analysis of that data; (4) requirements for test facilities and equipment; and (5) procedures for selecting and training evaluation subjects. The conceptual approach is discussed and described in general terms to increase its utility as general guidance for planning evaluations of pilot performance. Author

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-12084# National Aerospace Lab., Tokyo (Japan). Aeroengine Div.
RESEARCH AND DEVELOPMENT OF LIFT-JET ENGINE, 1
Feb. 1982 57 p refs In JAPANESE; ENGLISH summary 2 Vol.
(NAL-TR-699) Avail: NTIS HC A04/MF A01

High thrust to weight ratio lift jet engine research for V/STOL aircraft is reviewed. Development of the lift jet engine JR100 is reported. The engine was developed to provide power to satisfy the vertical thrust requirement of V/STOL aircraft, and was designed to have a permanent air bleed fed to auxiliary jets located at the aircraft extremeties. Improved models are discussed, including a JR200 series with lighter weight and higher performance. Author

N83-12085# National Aerospace Lab., Tokyo (Japan). Aeroengine Div.
RESEARCH AND DEVELOPMENT OF LIFT-JET ENGINE, 2
Feb. 1982 26 p refs 2 Vol.
(NAL-TR-700) Avail: NTIS HC A03/MF A01

The lift jet engine JR100V, scheduled to power a research plane during VTOL mode operations is reviewed. The JR100V was developed as a version of the JR100 series engines. It features higher thrust to weight ratio than that of the JR100F which was equipped on a flying test bed. Air cooled light weight structure, accessibility control for on board maintenance, in flight starting criteria, and electronic automatic starting are described and discussed. Author

N83-12086# National Aerospace Lab., Tokyo (Japan).
AN ENGINE INSTALLATION FOR FAN JET STOL AIRCRAFT USING USB POWERED HIGH LIFT SYSTEM (I) ENGINE MATCHING TEST FOR CIRCULAR CONFLUENT EXHAUST DUCT
Masakatsu Matsuki, Tadao Torisaki, Hiroshi Kondo, Susumu Nakayama, Shizuo Sekine, Akira Yoshida, Mitsuo Morita, Takeshi Koshinuma, Yukio Matsuda, Yoshiaki Fujisawa et al 1982 16 p refs In JAPANESE; ENGLISH summary
(NAL-TR-703; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Design data of an engine-nacelle for a USB powered high lift system on a STOL aircraft were obtained. In these design data, structure and strength of the engine-nacelle and conformity between an engine and its engine-nacelle are the most important problems. In order to obtain engine operational characteristics for mixing a fan and a core flow, a test was performed using a FJR 710 turbo-fan engine installed in a circular confluent exhaust duct. Test parameters of interest are the length of the mixing zone and the contraction of the mixing nozzle. As a result of this investigation, it was proved that a power-turbine output decreases with an increase of outlet pressure of the power-turbine due to the mixing, providing a design method to correct engine operational matching characteristics was found. Author

N83-12087*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A REMOTE AUGMENTOR LIFT SYSTEM WITH A TURBINE BYPASS ENGINE
Laurence H. Fishbach and Leo C. Franciscus 1982 12 p refs Presented at the 13th Cong. of the Intern. Council of Aeronautical Sci. and Aircraft Systems and Technol. Meeting, Seattle, 22-27 Aug. 1982
(NASA-TM-82932; E-1330; NAS 1.15:82932) Avail: NTIS HC A02/MF A01 CSCL 21E

Two supersonic vertical takeoff or landing (VTOL) aircraft engine types, a conventional medium bypass ratio turbofan, and a turbine bypass turbojet were studied. The aircraft assumed was a clipped delta wing with canard configuration. A VTOL deck launched intercept, DLI, mission with Mach 1.6 dash and cruise segments was used as the design mission. Several alternate missions requiring extended subsonic capabilities were analyzed. Comparisons were made between the turbofan (TF) and the turbine bypass turbojet (TBE) engines in airplane types using a Remote Augmented Lift Systems, RALS and a Lift plus Lift Cruise system (L+LC). The figure of merit was takeoff gross weight for the VTOL DLI mission. The results of the study show that the turbine bypass turbojet and the conventional turbofan are competitive engines for both type of aircraft in terms of takeoff gross weight and range. However, the turbine bypass turbojet would be a simpler engine and may result in more attractive life cycle costs and reduced maintenance. The RALS and L+LC airplane types with either TBE or TF engines have approximately the same aircraft takeoff gross weight. Author

N83-12088*# AiResearch Mfg. Co., Phoenix, Ariz.
ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT PROGRAM Monthly Technical Progress Report, 1 Aug. - 31 Aug. 1980
R. A. Rackley 26 Sep. 1980 124 p
(Contract DEN3-167)
(NASA-CR-169475; NAS 1.26:169475; AMC-31-3480(11); MTPR-11) Avail: NTIS HC A06/MF A01 CSCL 21E

Gas turbine automobile powertrain research is reported. The compressor, turbine, combustor, regenerator, gearbox, ceramic components/subsystems, bearings, and controls are discussed. N.W.

N83-12089*# Detroit Diesel Allison, Indianapolis, Ind.
COMPONENTS FOR DIGITALLY CONTROLLED AIRCRAFT ENGINES
Jay D. Meador Aug. 1981 107 p refs
(Contract NAS3-22046)
(NASA-CR-165296; NAS 1.26:165296; EDR-10696) Avail: NTIS HC A06/MF A01 CSCL 21E

Control system components suitable for use in digital electronic control systems are defined. Compressor geometry actuation concepts and fuel handling system concepts suitable for use in large high performance turbofan/turbojet engines are included. Eight conceptual system designs were formulated for the actuation of the compressor geometry. Six conceptual system designs were formulated for the engine fuel handling system. Assessment criteria and weighting factors were established and trade studies performed on their candidate systems to establish the relative merits of the various concepts. Fuel pumping and metering systems for small turboshaft engines were also studied. Seven conceptual designs were formulated, and trade studies performed. A simplified bypassing fuel metering scheme was selected and a preliminary design defined. S.L.

N83-12090*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ADVANCED TECHNOLOGIES FOR TURBOMACHINERY SYSTEMS: AN OVERVIEW
Melvin J. Hartmann Aug. 1982 78 p refs Presented at the 11th Ann. Turbomachinery Symp., Houston, Tex., 14-16 Dec. 1982
(NASA-TM-82949; E-1302; NAS 1.15:82949) Avail: NTIS HC A05/MF A01 CSCL 21E

Turbomachinery system components and associated technologies are discussed. Specific technologies reviewed include the compressor, turbine, internal flow analysis methods, combustion, fuels, materials, structures, bearings, seals, and lubrication, dynamics and controls, and instrumentation. Analytical procedures as a path to improved performance are discussed. The strong interaction between the various technologies if turbomachinery performance gains are to be realized is reflected. Author

N83-12091*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROTORCRAFT CONVERTIBLE ENGINES FOR THE 1980S
Joseph D. Eisenberg 1982 28 p refs Presented at the Rotary Wing Propulsion System Specialist Meeting, Williamsburg, Va., 16-18 Nov. 1982
(NASA-TM-83003; E-1443; NAS 1.15:83003) Avail: NTIS HC A03/MF A01 CSCL 21E

Two rotorcraft studies were executed. The goal was to identify attractive techniques for implementing convertible powerplants for the ABC, Folded Tilt Rotor, and X-wing type high speed, high-L/D rotorcraft; to determine the DOC and fuel savings benefits achieved thereby; and to define research required to bring these powerplants into existence by the 1990's. These studies are reviewed herein and the different methods of approach are pointed out as well as the key findings. Fan shaft engines using variable inlet guide vanes or torque converters, and turboprop powerplants appear attractive. Savings in DOC and fuel consumption of over 15 percent are predicted in some cases as a result of convertible engine use rather than using separate engines for the thrust and the shaft functions. Areas of required research are fan performance (including noise), integrated engine/rotorcraft control, torque converters, turbine design, airflow for rotorcraft torque control, bleed for lift flow, and transmissions and clutches. Author

N83-12092*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
QCSEE UNDER-THE-WING ENGINE-WING-FLAP AERODYNAMIC PROFILE CHARACTERISTICS
Harry E. Bloomer and Nicholas E. Samanich Sep. 1982 48 p refs
(NASA-TM-82890; E-1268; NAS 1.15:82890) Avail: NTIS HC A03/MF A01 CSCL 21E

As part of a broad-based NASA program to provide a technology base for future propulsion requirements for powered-lift aircraft, the Quiet, Clean, Short-Haul, Experimental Engine (QCSEE) program was begun by the Lewis Research Center in 1974. The initial buildup of the under-the-wing (UTW) engine was tested by the contractor at his test site. The UTW engine was delivered to Lewis in 1978 for further testing with wing and flap segments simulating an installation on a short-haul transport aircraft. The engine was also tested alone as an aid in identifying the various noise sources and their levels. As part of these tests the aerodynamic profiles at the exhaust nozzle and on the surfaces and in the wake of the wing-flap system were measured. This report documents, in plots and tabular form, the significant results from those tests. The results are presented as tabulations of aerodynamic data for all of the test points and as profiles of pressure, temperature, velocity, and normalized velocity and pressure for selected conditions. One of the main conclusions was that the measured flap surface temperatures were surprisingly low for both approach and takeoff flap settings. Author

N83-12093*# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
THE WISGSK: A COMPUTER CODE FOR THE PREDICTION OF A MULTISTAGE AXIAL COMPRESSOR PERFORMANCE WITH WATER INGESTION Final Report
T. Tsuchiya and S. N. B. Murthy Washington NASA Nov. 1982 256 p refs
(Grant NAG3-62)
(NASA-CR-3624; NAS 1.26:3624) Avail: NTIS HC A12/MF A01 CSCL 21E

A computer code is presented for the prediction of off-design axial flow compressor performance with water ingestion. Four processes were considered to account for the aero-thermo-mechanical interactions during operation with air-water droplet mixture flow: (1) blade performance change, (2) centrifuging of water droplets, (3) heat and mass transfer process between the gaseous and the liquid phases and (4) droplet size redistribution due to break-up. Stage and compressor performance are obtained by a stage stacking procedure using representative veocity diagrams at a rotor inlet and outlet mean radii. The Code has options for performance estimation with (1) mixtures of gas and (2) gas-water droplet mixtures, and therefore can take into account the humidity present in ambient conditions. A test case illustrates the method of using the Code. The Code follows closely the methodology and architecture of the NASA-STGSTK Code for the estimation of axial-flow compressor performance with air flow. Author

N83-12094*# General Electric Co., Evendale, Ohio. Aircraft Engine Group.
ENERGY EFFICIENT ENGINE. FLIGHT PROPULSION SYSTEM PRELIMINARY ANALYSIS AND DESIGN Report, Jan. 1978 - Nov. 1979
Richard P. Johnston Nov. 1979 50 p refs
(Contract NAS3-20643)
(NASA-CR-159859; NAS 1.26:159859; R80AEG396) Avail: NTIS HC A03/MF A01 CSCL 21E

The characteristics of an advanced Flight Propulsion System (FPS) suitable for introduction in the late 1980's to early 1990's, were defined. It was determined that NASA goals for efficiency,

environmental considerations, and economics could be met or exceeded with the possible exception of NOx emission. In evaluating the FPS, all aspects were considered including component design, performance, weight, initial cost, maintenance cost, engine-system integration (including nacelle), and aircraft integration considerations. In terms of the NASA goals, the current FPS installed specific fuel consumption was reduced 14.2% from that of the CF6-50C reference engine. When integrated into an advanced, subsonic, study transport, the FPS produced a fuel-burn savings of 15 to 23% and a direct operating cost reduction of 5 to 12% depending on the mission and study-aircraft characteristics relative to the reference engine. J.M.S.

N83-12095# Dayton Univ., Ohio. Energy Conversion/ Aerodynamics Group.

CHARACTERISTICS OF HIGH PERFORMANCE EJECTORS Final Report, 30 Jan. - 30 Nov. 1981

John E. Minardi Wright-Patterson AFB, Ohio AFWAL Jan. 1982 94 p refs

(Contract F33615-81-K-3017; AF Proj. 2404)

(AD-A118720; UDR-TR-82-01; AFWAL-TR-81-3170) Avail: NTIS HC A05/MF A01 CSCL 21/5

The use of ejectors in energy conversion processes and thrust augmentation requires that the mixed flow be produced at a high efficiency. Although many definitions of efficiency have been used to describe the efficiency of an ejectors, we have used an efficiency based on thermodynamic availability which is referenced to the stagnation properties of the secondary flow (the flow being 'pumped'). As is well known, a compressible-flow, control-volume approach to analyzing a constant area ejector yields two solutions: one with a subsonic mixed flow and one with a supersonic mixed flow. The supersonic mixed flow produces the best efficiencies and highest total pressures. The properties of the supersonic mixed flow are of necessity related to the properties of the subsonic mixed flow by the normal shock relations. Nonetheless, in practice, the subsonic mixed flow is, in general, not achieved through a normal shock (or pseudo-normal shock) from the supersonic mixed flow solution. A model is presented that gives a physical interpretation to the various solutions obtained from the mathematics, and more importantly, some fundamental limits are presented and a procedure is developed for determining the efficiency that can be achieved in a constant area ejector when the mixed flow is supersonic. GRA

N83-12096# Pennsylvania State Univ., University Park. Applied Research Lab.

EFFICIENCY IMPROVED TURBOPROP

W. S. Gearhart 10 Jun. 1982 29 p refs

(Contract N00024-79-C-6043)

(AD-A118819; ARL/PSU/TM-82-124) Avail: NTIS HC A03/MF A01 CSCL 21/5

Renewed attention has been focused on the efficiency of aircraft propulsion as the cost of fuel has risen. Studies conducted by NASA (1) to obtain fuel efficient aircraft have considered relatively highly-loaded turbo-prop systems. The disc loadings of these propellers are as much as four times higher than those on present turboprop aircraft. The higher disc loadings result in greater slipstream swirl and higher energy losses. Of primary importance is the radial distribution of the energy losses across the slipstream due to the tangential and axial velocities. This study presents the results of analysis defining the various sources of energy loss resulting from a swirling slipstream downstream of a propeller. Experimental data are presented demonstrating the presence of such losses and a propeller configuration discussed which offers improved propulsive performance when relatively highly-loaded propellers are employed. Author (GRA)

N83-12163*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TURBINE ENGINE MATERIALS DURABILITY RESEARCH

S. R. Levine and C. A. Stearns *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 313-334 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 21E

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-12097# Aeronautical Research Labs., Melbourne (Australia).

A GENERAL PROGRAM FOR PREDICTING RIGID-AIRCRAFT GUST RESPONSE

R. A. Feik Jan. 1982 29 p refs

(ARL-Aero-Note-407; AR-002-331) Copyright. Avail: NTIS HC A03/MF A01

A FORTRAN program was developed for rigid-aircraft gust response calculations. Equations of motion for the aircraft dynamics are defined in the program and may be augmented to include flight control systems. Input data are used to describe a particular aircraft configuration, aerodynamic data, and flight conditions. The program calculates the gust response spectra. The relatively simple gust model included may be modified or extended readily. The transfer functons may also be used to obtain time-domain responses to discrete gusts. examples show the effects on gust response of variations in configuration, aerodynamics and control systems. Author

N83-12098*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THUMB ACTUATED TWO AXIS CONTROLLER Patent Application

Richard H. Hollow, inventor (to NASA) (Computer Sciences Corp., Mountain View, Calif.) Filed 8 Sep. 1982 19 p Sponsored by NASA

(NASA-Case-ARC-11372-1; US-Patent-Appl-SN-415878) Avail: NTIS HC A02/MF A01 CSCL 01C

A two axis joystick controller is described. It produces at least one output signal in relation to pivotal displacement of a member with respect to an intersection of the two axes. The member is pivotally movable on a support with respect to the two axes. The support has a centrally disposed aperture. A light source is mounted on the pivotally movable member above the aperture to direct light through the aperture. A light sensor is mounted below the aperture in the support at the intersection of the two axes to receive the light from the light source directed through the aperture. The light sensor produces at least one output signal related to a location on the sensor at which the light from the light source strikes the sensor. NASA

N83-12099*# Piasecki Aircraft Corp., Philadelphia, Pa.

HYBRID LTA VEHICLE CONTROLLABILITY AS AFFECTED BY BUOYANCY RATIO Final Report

Donald N. Meyers, Piotr Kubicki, T. Tarczynski, A. Fairbanks, and F. N. Piasecki Oct. 1979 63 p

(Contract NAS2-101085)

(NASA-CR-152344; NAS 1.26:152344; PIAC-97-C-6) Avail: NTIS HC A04/MF A01 CSCL 01C

The zero and low speed controllability of heavy lift airships under various wind conditions as affected by the buoyancy ratio are investigated. A series of three hybrid LTA vehicls were examined, each having a dynamic thrust system comprised of four H-34 helicopters, but with buoyant envelopes of different volumes (and hence buoyancies), and with varying percentage of helium inflation and varying useful loads (hence gross weights). Buoyancy ratio, B, was thus examined varying from approximately 0.44 to 1.39. For values of B greater than 1.0, the dynamic thrusters must supply negative thrust (i.e. downward). S.L.

N83-12100# Calspan Advanced Technology Center, Buffalo, N.Y. Flight Research Dept.

LATERAL FLYING QUALITIES OF HIGHLY AUGMENTED FIGHTER

AIRCRAFT, VOLUME 2 Final Report, Mar. 1980 - May 1982
Stephen J. Monagan, Rogers E. Smith, and Randall E. Bailey Wright-Patterson AFB, Ohio AFWAL Jun. 1982 282 p refs
(Contract F33615-79-C-3618)
(AD-A118071; CALSPAN-6645-F-8-Vol-2;
AFWAL-TR-81-3171-Vol-2) Avail: NTIS HC A13/MF A01 CSCL 01/3

Lateral-directional flying qualities data applicable to highly augmented fighter aircraft were generated. The effects of time delay and prefilter lag in the lateral flight control system were studied. The combined effects of these elements as well as the effects of nonlinear command gain and high Dutch roll damping were also evaluated. Tasks included were actual target tracking, air refueling, and precision landing as well as special Head-Up Display (HUD) tracking tasks. Results indicated that a properly designed HUD bank angle tracking task is a valid flying qualities evaluation task. Data show that lateral flying qualities are very sensitive to control system time delay and very short values of roll mode time constant typically result in poor lateral flying qualities. Excellent separation of the data into flying qualities levels is achieved. An optimum equivalent time constant value of 0.5 sec is indicated by the data; sensitivity to equivalent time delay is a minimum at this value. Pilot ratings are tabulated. Author

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-12101# Wills (W. P.), Dallas, Tex.
CURRENT PRACTICES ON NIGHTTIME PAVEMENT CONSTRUCTION ASPHALTIC CONCRETE Final Report
W. P. Wills Jul. 1982 103 p refs Sponsored by FAA
(DOT/FAA-RD-80-121) Avail: NTIS HC A06/MF A01

The magnitude of scheduled airline operations at civil airports has made it imperative that runway repair and overlay with hot mix asphaltic concrete be accomplished at night so as not to interfere with normal airline flight schedules. Technical data and recommended construction practices such as working hours, construction lighting, automatic grade control, standby equipment, compaction, milling, stress absorbing membrane, sawing joints in overlay, construction of transition and other related items are discussed. Author

N83-12102*# Kentron International, Inc., Hampton, Va. Hampton Technical Center.
EXTRACTION OF MODEL PERFORMANCE FROM WALL DATA IN A 2-DIMENSIONAL TRANSONIC FLEXIBLE WALLED TEST SECTION Final Report
M. J. Goodyer Sep. 1982 22 p refs
(Contract NAS1-16000; Grant NsG-7172)
(NASA-CR-165994; NAS 1.26:165994; TO3-TZ20) Avail: NTIS HC A02/MF A01 CSCL 14B

Data obtained from the boundary of a test section provides information on the model contained within it. A method for extracting some of this data in two dimensional testing is described. Examples of model data are included on lift, pitching moment and wake displacement thickness. A FORTRAN listing is also described, having a form suitable for incorporation into the software package used in the running of such a test section. Author

N83-12103# Naval Training Equipment Center, Orlando, Fla. Advanced Simulation Concepts Lab.
A VISUAL TECHNOLOGY RESEARCH SIMULATOR FOR VERTICAL TAKE OFF AND LANDING (VTOL) Interim Report
Jack W. Herndon 15 Mar. 1982 26 p refs
(AD-A115626; NAVTRAEQUIPCEN-IH-337) Avail: NTIS HC A03/MF A01 CSCL 05/9

The Visual Technology Research Simulator (VIRS) Vertical Take Off and Landing (VTOL) visual system, including hardware and capabilities, is described. Author

N83-12104# ARO, Inc., Arnold Air Force Station, Tenn.
THE 1981 CALIBRATION OF THE AEDC-PWT AERODYNAMIC WIND TUNNEL (4T) AT MACH NUMBERS FROM 0.1 TO 1.3 Final Report, 18-24 Mar. 1981
Wallace Luchuk, Charles F. Anderson, and Melvin L. Homan AEDC Aug. 1982 87 p refs
(AD-A118704; AEDC-TR-82-10) Avail: NTIS HC A05/MF A01 CSCL 14/2

The Propulsion Wind Tunnel facility Aerodynamic Wind Tunnel (4T) has been recalibrated. Measurements of the tunnel centerline Mach number distributions and tunnel calibration parameter have been obtained over a Mach number range from 0.1 to 1.3. The bulk of the Mach number measurements was made at a total pressure of 1,200 psfa, with other measurements taken at pressures ranging from 600 to 3,100 at selected Mach numbers. Data were obtained for tunnel wall porosities of 4, 5, and 6 percent over the entire Mach number range and for wall porosities ranging from 1 to 7 percent at selected transonic Mach numbers. Results of previously obtained flow angularity measurements in the test section made over a Mach number range of 0.4 to 1.3 are presented. Effects of honeycomb geometry and asymmetric wall porosity on the mean flow angles and on the standard deviations in flow angles are also presented. Author (GRA)

N83-12105# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Civil Engineering.
FEASIBILITY OF COMPUTING RESIDUAL DISPLACEMENTS IN RUNWAYS AND CRATER REPAIRS Final Report
Lawrence C. Rude Apr. 1982 57 p refs
(Grant AF-AFOSR-0102-81; AF Proj. 2307)
(AD-A118610; AFOSR-82-0669TR) Avail: NTIS HC A04/MF A01 CSCL 13/2

The purpose of this study was to determine the feasibility of computing residual displacements in runways and crater repairs under repeated aircraft loadings. This report presents a methodology for computing residual displacements that is economical and easy to use. It also contains a literature review and a presentation of a second procedure to compute residual displacements. Sample calculations were done to illustrate the first procedure and the results compared favorably with previously published test data. The limitations of the second procedure were also discussed. Author (GRA)

N83-12106# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.
RESEARCH ISSUES IN THE DETERMINATION OF SIMULATOR FIDELITY: PROCEEDINGS OF THE ARI SPONSORED WORKSHOP
Robert T. Hays, ed. Nov. 1981 168 p refs Workshop held 23-24 Jul. 1981
(DA Proj. 2Q1-62717-A-790)
(AD-A118253; ARI-TR-547) Avail: NTIS HC A08/MF A01 CSCL 05/9

This report is the proceedings from an ARI sponsored workshop on 'Research Issues in Simulator Fidelity.' Papers are included which: (1) state the goals and organization of the workshop, (2) present topics which were addressed during the workshop, (3) summarize the efforts of the working/discussion groups, and (4) summarize the results of the workshop as a whole. Workshop topics included definitional issues, communications issues, research support issues and research methodology issues. Author (GRA)

N83-12107# Texas Univ., Austin. Applied Research Lab.
OPERATION AND MAINTENANCE OF GEODETIC SATELLITE OBSERVATORY, MCMURDO, ANTARCTICA Semiannual Report, 1 Oct. 1980 - 31 Mar. 1981
David L. Honea and Arnold J. Tucker 13 Nov. 1981 16 p 2 Vol.

(Grant NSF DPP-68-00508)
(PB82-187923; ARL-TR-81-49) Avail: NTIS HC A02/MF A01 CSCL 22D

Data acquisition and tracking procedures for navigation and beacon satellites maintenance and repair of electronic equipment, and physical upkeep of the station are summarized. The data gathered were used in geodetic studies, ionospheric investigations, and for navigational purposes. In addition, a program utilizing the refraction term error from the Doppler tracking data as a diagnostic to investigate certain characteristics of the ionsphere was brought into full operation. GRA

N83-12108# Texas Univ., Austin. Applied Research Lab.
OPERATION AND MAINTENANCE OF GEODETIC SATELLITE OBSERVATORY, MCMURDO, ANTARCTICA Semiannual Report, 1 Apr. - 30 Sep. 1981
David L. Honea and Arnold J. Tucker 13 Nov. 1981 21 p 2 Vol.
(Grant NSF DPP-68-00508)
(PB82-187931; ARL-TR-81-50) Avail: NTIS HC A02/MF A01 CSCL 22D

The satellite tracking station at McMurdo, Antarctica, was operated continuously. Satellite data were recorded and submitted for analysis. A total of 6076 sets of Doppler and timing data were recorded from satellites. These data were recorded on paper tape and sent via radio teletype for analysis. Magnetometer data were recorded from the TRIAD satellite on magnetic tape and returned for analysis. These data are measurements of the magnetic field at 1000 km. Ionospheric refraction data from the refraction correction unit were recorded on cassette tapes and returned for reduction and analysis. GRA

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-12109*# Lunar and Planetary Inst., Houston, Tex.
EXTRATERRESTRIAL MATERIALS PROCESSING AND CONSTRUCTION Final Report
David R. Criswell, Robert D. Waldron, and John D. McKenzie 31 Jan. 1980 655 p refs
(Contract NSR-09-051-001)
(NASA-CR-167756; NAS 1.26:167756) Avail: NTIS HC A99/MF A01 CSCL 22A

Three different chemical processing schemes were identified for separating lunar soils into the major oxides and elements. Feedstock production for space industry; an HF acid leach process; electrorefining processes for lunar free metal and metal derived from chemical processing of lunar soils; production and use of silanes and spectrally selective materials; glass, ceramics, and electrochemistry workshops; and an econometric model of bootstrapping space industry are discussed. N.W.

N83-12110# Institute of Space and Astronautical Science, Tokyo (Japan).
PLANET-A, JAPANESE FIRST INTERPLANETARY FLIGHT, SECOND EDITION Status Report
Oct. 1982 56 p
(SES-TD-82-014) Avail: NTIS HC A04/MF A01

The Planet-A mission and MS-T5 mission are described. The Planet-A mission consists of a space probe to take vacuum ultraviolet images of Halley's Comet and measure the solar wind plasma near the comet. The MS-T5 mission consists of a test spacecraft launched into interplanetary space to prove the capability of a satellite launcher. Author

N83-12111# RAND Corp., Santa Monica, Calif.
TRANSMISSION AND ORBITAL CONSTRAINTS IN SPACE-RELATED PROGRAMS: BRIEFING SUMMARY, ADDENDUM
A. L. Hiebert Nov. 1981 51 p refs Addendum to RAND/N-1536-AF
(AD-A118809; RAND/P-6713; RAND/N-1536-AF) Avail: NTIS HC A04/MF A01 CSCL 22/2

This briefing outlines the project objectives and tasks required to develop a continuing program for predicting and analyzing the spectrum and orbital requirements of current and future space-related systems, and for predicting potential saturation conditions. The product objectives are to design and develop a capability for: (1) predicting and analyzing spectrum/orbital requirements of current and projected U.S. and international space-related programs, (2) evaluating engineering and architectural designs, (3) identifying and analyzing intentional/unintentional EMI, (4) predicting saturation in spectrum usage/orbital positions, (5) assessing means to accommodate growth, and (6) supporting preparations for space services WARC. GRA

N83-12112# Los Alamos Scientific Lab., N. Mex.
INTERNATIONAL RESEARCH LABORATORY ON THE MOON: A PROPOSAL FOR A NATIONAL COMMITMENT
Paul W. Keaton and Eric M. Gelfand Jan. 1982 10 p refs
(Contract W-7405-eng-36)
(DE82-010043; LA-9143-MS) Avail: NTIS HC A02/MF A01

A self sustaining international research laboratory on the Moon is suggested. Scientists from all over the world would use the laboratory for basic and applied programs in natural and social sciences. The lunar research facility would be built with a broadly based infrastructure of stations, vehicles, and programs that can be envisioned as a pyramid resting on the Earth and reaching to the Moon. The first element of the infrastructure is the reusable Space Shuttle; the second is a manned low Earth orbit platform. Next is an orbital transfer vehicle for hauling cargoes between low Earth orbit and low lunar orbit. The final element is the manned self-sustaining international research laboratory. DOE

N83-12113# Indian Space Research Organization, Bangalore.
NATIONAL PAPER OF INDIA FOR THE SECOND UNITED NATIONS CONFERENCE ON EXPLORATION AND PEACEFUL USES OF OUTER SPACE (UNISPACE 82)
1982 67 p Conf. held in 1982 Sponsored by the Government of India
(PB82-252743) Avail: NTIS HC A04/MF A01 CSCL 22A

The state and applications of space science and technology in India are discussed along with the underlying philosophy and future directions of the Indian space program. Issues regarding space resouces utilization and international cooperation are also addressed. For individual titles, see N83-12114 through N83-12119.

N83-12114# Indian Space Research Organization, Bangalore.
STATE OF SPACE SCIENCE AND TECHNOLOGY
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 17-22 refs (For primary document see N83-12113 03-12)
Avail: NTIS HC A04/MF A01 CSCL 22A

A historical overview of the development of space science and technology in India is presented emphasizing the directions of research and the establishment of government commissions and organizations. The areas of research presently being pursued are also discussed. Efforts in basic research include the upper atmosphere, Sun-Earth relationship, cosmic rays, astrophysics, space astronomy and solar physics. Satellie and launch vehicle technology projects are described along with applications goals in remote sensing, communications, meteorology, and geodesy. M.G.

N83-12115# Indian Space Research Organization, Bangalore.
APPLICATIONS OF SPACE SCIENCE AND TECHNOLOGY
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 23-30 refs (For primary document see N83-12113 03-12)
Avail: NTIS HC A04/MF A01 CSCL 22A

Space technology applications in the areas of communications, meteorology, geodesy, and remote sensing undertaken by Indian research organizations and international projects are discussed.

The development of the INSAT system, the Satellite Instructional Television Experiment, the Satellite Telecommunications Experiments Project, and the APPLE satellite are specifically addressed. Indian participation in the MONEX experiment is also discussed. M.G.

N83-12116# Indian Space Research Organization, Bangalore.
AN APPRAISAL OF THE PROGRAMME
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 31-33 refs (For primary document see N83-12113 03-12) Avail: NTIS HC A04/MF A01 CSCL 22A

The philosophy behind the Indian space program is elucidated. The program objective is to initiate, develop, and master space science and echnology to exploit their potentialities for the socio-economic development of the country. An important element of the program is also the emphasis on self reliance. Specific achievements are examined in the context of these goals. M.G.

N83-12117# Indian Space Research Organization, Bangalore.
LOOKING AHEAD
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 34-37 refs (For primary document see N83-12113 03-12) Avail: NTIS HC A04/MF A01 CSCL 22A

Ongoing and planned activities of the Indian space program are discussed in the context of a progression towards fully operational space systems. The Indian National Satellite (INSAT) System, indian remote sensing program, proto-INSAT satellites, launch vehicle development program, and the involvement of Indian industry are specifically addressed. M.G.

N83-12118# Indian Space Research Organization, Bangalore.
INTERNATIONAL ISSUES
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 38-44 refs (For primary document see N83-12113 03-12) Avail: NTIS HC A04/MF A01 CSCL 22A

International issues regarding space resources and technology utilization are examined. Specific topics include the use of the geostationary satellite orbit, direct broadcasting systems, surveillance and remote sensing, the definition of 'outer space' and related matters, compatibility and complementarity of satellite systems, and implications of new technologies. In addition, the significance of technical cooperation among developing countries is examined. M.G.

N83-12119# Indian Space Research Organization, Bangalore.
INTERNATIONAL CO-OPERATION AND THE ROLE OF THE UNITED NATIONS
In its Natl. Paper of India for the 2d United Nations Conf. on Exploration and Peaceful Uses of Outer Space (UNISPACE 82) 1982 p 45-48 refs (For primary document see N83-12113 03-12) Avail: NTIS HC A04/MF A01 CSCL 22A

The Indian experience with international cooperation is outlined and an assessment of cooperative agreement is given. The function of the United Nations and related agencies in coordinating space technology development is described with particular emphasis given to the possible benefits for developing nations. M.G.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-12120# National Aerospace Lab., Tokyo (Japan).
EFFECTS OF MOTION OF THE EQUATORIAL PLANE ON EQUATORIAL ELEMENTS OF AN EARTH SATELLITE
Sumio Takeuchi 1982 18 p refs In JAPANESE; ENGLISH summary
(NAL-TR-695; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

As the reference system an intermediate, quasi-inertial reference frame is adopted. In this system the inclination and the argument of perigee are referred to the instantaneous equator of date, and the longitude of the node is measured from the mean equinox of 1950.0 along the mean equator of 1950.0 and then along the instantaneous equator of date. The Earth is rotating uniformly in this system, thus giving a particularly simple expression for the sidereal angle. The Lagrange's planetary equations in their usual form which hold for the orbital elements referred to the nonrotating axial system defined at 1950.0 are used. Then the equations are modified to include the effects of motion of the reference system and transformed into Gaussian form. Because of this motion partial derivatives of orbital elements with respect to time are introduced in the equations. The partial derivatives are derived from the expressions including the terms up to the third order of precession. The equations are solved by the method of linear perturbations and the perturbations to satellite equatorial orbital elements by the motion of the equatorial plane are obtained. S.L.

N83-12121# National Aerospace Lab., Tokyo (Japan).
OPTIMAL LOW-THRUST EARTH ESCAPE SPIRAL TRAJECTORIES FROM GEOSYNCHRONOUS ORBIT
Shoichi Yoshimura and Tatsuo Yamanaka 1982 18 p refs In JAPANESE; ENGLISH summary
(NAL-TR-704; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Minimum time low thrust Earth escape spiral trajectories from geosynchronous orbit were calculated. The two point boundary value problem was solved with very good convergence by one of the direct methods (two-dimensional search conjugated gradient method with penalty function), using the digital computer FACOM 203-75. Starting from geosynchronous orbit, the spacecraft increases both its orbital altitude and its total energy E (kinetic energy plus potential energy in Earth's gravitational field), rotating round the Earth along the spiral trajectory, and then attains the parabolic velocity (E=O). The thrust vector oscillates around the velocity vector, i.e., the tangential direction with the period almost equal to the rotatonal period of the orbit. The synchronization is clearer in the first portion of the trajectory and for a smaller initial acceleration. The amplitude of the oscillation increases gradually in the first portion, but begins to decrease in the final portion of the trajectory, and reaches zero at the escape point. S.L.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N83-12122# White Sands Missile Range, N.Mex. Mathematical Services Branch.
A MODIFIED NEWTON METHOD FOR MULTILATERATION AND ITS APPLICATION TO THE RMS/MTTS SYSTEM
William S. Agee and Robert H. Turner Aug. 1982 43 p refs
(AD-A118728; WSMR-TR-81) Avail: NTIS HC A03/MF A01 CSCL 16/1

A globally convergent, modified Newton method is developed for the least squares estimation of target from a DME type range measuring system. The resulting algorithm is used to evaluate the effects of truncation error on the accuracy of the position estimates for the RMS/MTTS system located at MacGregor Range. GRA

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-12123# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDIES OF THE AERODYNAMIC FORCES ON ARTIFICIAL SATELLITES [ESTUDOS DE FORCAS AERODINAMICAS SOBRE SATELITES ARTIFICIAIS]
Luiz Danilo Damasceno Ferreira Apr. 1982 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 3rd School of Appl. Math., Rio de Janeiro, 15-19 Feb. 1982
(INPE-2387-PRE/107) Avail: NTIS HC A02/MF A01

The interaction of an artificial satellite with the Earth's atmosphere causes perturbations on its orbits. Simplifying hypotheses are considered in the modeling of the aerodynamic forces, and from Lagrange's planetary equations it is possible to calculate the perturbations in the orbital elements of an artificial satellite. Author

N83-12124# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PERTURBATION OF ARTIFICIAL SATELLITES DUE TO TIDES
Hans-Ulrich Pilchowski Apr. 1982 14 p refs In PORTUGUESE; ENGLISH summary Presented at the 3rd School of Appl. Math., Rio de Janeiro, 15-19 Feb. 1982 Submitted for publication
(INPE-2388-PRE/108) Avail: NTIS HC A02/MF A01

A theoretical model is presented to compute the tide influences over orbits of artificial satellites. Author

N83-12125# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONDITIONS OF ATTITUDE STABILITY FOR A FLEXIBLE SATELLITE
Paulo Tadeu deMello Lourencao and Donizeti Leonel Ferreira Apr. 1982 13 p refs In PORTUGUESE; ENGLISH summary Presented at the 3rd School of Appl. Math., Rio de Janeiro, 15-19 Feb. 1982 Submitted for publication
(INPE-2389-PRE/109) Avail: NTIS HC A02/MF A01

Two different approaches to analyze the attitude stability of a satellite with flexible appendages are presented. The first one uses Liapunov's direct method to obtain sufficient stability conditions in the neighborhood of trivial equilibrium position. The second method consists in the numerical integration of nonlinear equations of motion. The applications of the results obtained according to each method are discussed. Author

N83-12126# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE NEUTRAL PARTICLE DENSITY FIELD AROUND A SATELLITE
Nellore S. Venkataraman and Isabel Maria deMoraes Aug. 1982 15 p refs Presented at the 34th Ann. Meeting of SBPC, Sao Paulo, Brazil, 6-14 Jul. 1982
(INPE-2504-PRE/185) Avail: NTIS HC A02/MF A01

The problem of mapping the density field around a spherical satellite moving with a constant velocity is analyzed. The method of characteristics was used to solve the collisionless Boltzmann equation. The density field is obtained by integrating the distribution function in the velocity space. An analytical expression for the number density is provided. Author

N83-12127# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FLEXIBLE SATELLITE ORIENTATION, USING THE MODAL-ANALYSIS METHOD FOR GYROSCOPIC SYSTEMS [ESTUDO DO MOVIMENTO DE ORIENTACAO DE UM SATELITE COM APENDICES FLEXIVEIS, UTILIZANDO-SE O METODO DE ANALISE MODAL PARA SISTEMAS GIROSCOPICOS]
Palo Tadeu deMello Lourencao and Donizeti Leonel Ferreira Aug. 1982 31 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Reuniao Anual da SBPC, Sao Paulo em Campinas, Brazil, 6-14 Jul. 1982
(INPE-2505-PRE/186) Avail: NTIS HC A03/MF A01

A procedure for the solution of the eigenvalue problems related to gyroscopic systems using the modal-analysis method is described. The equations of motion represent a class of dynamic systems known as gyroscopic systems. A transformation is made in the state space, which allows the decoupling of theses equations, determining the eigenvalues and eigenvector corresponding to the vibration modes of this type of system. The procedure is applied to a satellite with two flexible appendages, and the eigenvalues and eigenvectors related to rotational and vibrational motions are determined. Also the system time response is obtained in the form of analytical expressions. This is of particular interest for on-board autonomous attitude control of satellites. Author

N83-12128# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INSOLATION OF A DATA COLLECTING SATELLITE FROM THE POINT OF VIEW OF ORBITAL GEOMETRY FOR OPTIMIZATION OF ENERGY CONSERVATION [INSOLACAO DO SATELITE COLETA-DE-DADOS SOB O PONTO DE VISTA DA GEOMETRIA ORBITAL PARA OTIMIZACAO DO APROVEITAMENTO DE ENERGIA]
Valder Matos deMedeiros Sep. 1982 36 p refs In PORTUGUESE; ENGLISH summary
(INPE-2545-RPE/419) Avail: NTIS HC A03/MF A01

The insolation of a satellite which utilizes solar energy in supplying energy to the on-board systems was investigated. The effect of the orbital geometry and insolation on conditions for determining the launch window is determined. A typical data collection satellite with predefined orbital geometry was considered. Author

N83-12129*# Columbia Univ., New York. Dept. of Electrical Engineering.
NEXT GENERATION COMMUNICATIONS SATELLITES: MULTIPLE ACCESS AND NETWORK STUDIES Final Report
H. E. Meadows, M. Schwartz, T. E. Stern, S. Ganguly, B. Kraimeche, K. Matsuo, and I. Gopal Sep. 1982 218 p refs
(Contract NAS3-22464)
(NASA-CR-167903; NAS 1.26:167903) Avail: NTIS HC A10/MF A01 CSCL 22B

Efficient resource allocation and network design for satellite systems serving heterogeneous user populations with large numbers of small direct-to-user Earth stations are discussed. Focus is on TDMA systems involving a high degree of frequency reuse by means of satellite-switched multiple beams (SSMB) with varying degrees of onboard processing. Algorithms for the efficient utilization of the satellite resources were developed. The effect of skewed traffic, overlapping beams and batched arrivals in packet-switched SSMB systems, integration of stream and bursty traffic, and optimal circuit scheduling in SSMB systems: performance bounds and computational complexity are discussed. Author

N83-12130# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
HIGH-LEVEL SPACECRAFT CHARGING ENVIRONMENTS NEAR GEOSYNCHRONOUS ORBIT Interim Scientific Report
E. G. Mullen and M. S. Gussenhoven (Boston College) 11 Feb. 1982 49 p refs
(AF Proj. 7661)
(AD-A118791; AFGL-TR-82-0063; AFGL-ERP-771) Avail: NTIS HC A03/MF A01 CSCL 22/2

High-level spacecraft charging events in sunlight are discussed and statistically analyzed to determine environmental parameters critical to charging and the region of space near geosynchronous altitude where charging occurs. Significant levels of spacecraft charging are shown to occur only between 1900 LT and 0900 LT at any altitude or latitude of the SCATHA satellite orbit. High-level charging is shown to occur only during periods when the magnetic activity index is 2+ or greater. Distribution functions of energetic

electrons and ions are presented for 3 high-level charging periods on days 114, 241 and 363, 1979. Moments of the distribution functions are determined, and fitting techniques used to derive two-Maxwellian densities and temperatures are discussed. Results are provided in a format usable in satellite design specifications. GRA

N83-12131# National Oceanic and Atmospheric Administration, Washington, D. C. Office of Systems Development.
MODIFIED VERSION OF THE TIROS N/NOAA A-G SATELLITE SERIES (NOAA E-J) ADVANCED TIROS N (ATN)
Arthur Schwalb Feb. 1982 33 p
(PB82-194044; NOAA-82032901; NOAA-TM-NESS-116) Avail: NTIS HC A03/MF A01 CSCL 13B

The TIROS N/NOAA A-G satellites described in NOAA Technical Memorandum NESS 95 were modified to add payload capacity without changing the basic environmental mission of the series. Three additional satellites are being added to the initial procurement to extend the lifetime of the program to the end of the decade. Incrementally added to the payload will be a search and rescue demonstration system, an Earth radiation budget experiment, and an operational solar backscatter ultraviolet radiometer which will monitor the distribution of ozone in the atmosphere. Characteristics of the real time data links (APT, HRPT and DSB) will not be changed by the addition of these instruments. GRA

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-12132*# National Aeronautics and Space Administration, Washington, D. C.
STS-5 FIFTH SPACE SHUTTLE MISSION, FIRST OPERATIONAL FLIGHT: PRESS KIT
Oct. 1982 67 p
(NASA-TM-84890; NAS 1.15:84890; News-Release-82-156) Avail: NTIS HC A04/MF A01 CSCL 22A

Schedules for the fifth Space Shuttle flight are provided. Launching procedure, extravehicular activity, contingency plans, satellite deployment, and onboard experiments are discussed. Landing procedures, tracking facilities, and crew data are provided. N.W.

N83-12133*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SIMULATION OF TIME-VARYING ASCENT LOADS ON ARRAYS OF SHUTTLE TILES IN A LARGE TRANSONIC TUNNEL
Percy J. Bobbitt, C. L. W. Edwards, and Richard W. Barnwell Nov. 1982 52 p refs Presented at AIAA 12th Aerodyn. Testing Conf., Williamsburg, Va., 22-24 Mar. 1982 Previously announced in AIAA as A82-0566
(NASA-TM-84529; L-15439; NAS 1.15:84529) Avail: NTIS HC A04/MF A01 CSCL 22B

For abstract, see A82-24682.

N83-12134*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT: SPACE SHUTTLE PROGRAM
5 Nov. 1982 24 p
(NASA-TM-84889; M-989-82-05; NAS 1.15:84889; STS-5) Avail: NTIS HC A02/MF A01 CSCL 22A

The STS-5 mission is described. Mission objectives are stated. Abort capability, commercial payloads, NASA experiments, instrumentation packages, student experiments, and the get away special are discussed. Operational medicine is also discussed. Crew data are provided. N.W.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-12135*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
STRAIN GAGE LOAD MEASUREMENT ON THE SHUTTLE ORBITER
Alan L. Carter Nov. 1982 11 p refs Presented at SESA 1982 Fall Meeting, Hartford, Conn., 7-12 Nov. 1982
(NASA-TM-84898; NAS 1.15:84898) Avail: NTIS HC A02/MF A01 CSCL 22B

This paper describes the application of the calibrated strain gage load measurement method to the shuttle orbiter. Descriptions of instrumentation and calibration are included, along with comparisons of measured results with wind tunnel and FLEXSTAB analytical predictions. Author

N83-12136*# IRT Corp., San Diego, Calif.
DEVELOPMENT OF ELECTRICAL TEST PROCEDURES FOR QUALIFICATION OF SPACECRAFT AGAINST EID. VOLUME 1: THE CAN TEST AND OTHER RELEVANT DATA Progress Report, Mar. - Sep. 1981
J. M. Wilkenfeld, R. J. R. Judge, and B. L. Harlacher Apr. 1982 152 p refs 2 Vol.
(Contract NAS3-21967)
(NASA-CR-165590; NAS 1.26:165990; IRT-8195-018-Vol-1) Avail: NTIS HC A08/MF A01 CSCL 22B

A combined experimental and analytical program to develop system electrical test procedures for the qualification of spacecraft against damage produced by space-electron-induced discharges (EID) occurring on spacecraft dielectric outer surfaces is described. The data on the response of a simple satellite model, called CAN, to electron-induced discharges is presented. The experimental results were compared to predicted behavior and to the response of the CAN to electrical injection techniques simulating blowoff and arc discharges. Also included is a review of significant results from other ground tests and the P78-2 program to form a data base from which is specified those test procedures which optimally simulate the response of spacecraft to EID. The electrical and electron spraying test data were evaluated to provide a first-cut determination of the best methods for performance of electrical excitation qualification tests from the point of view of simulation fidelity. Author

N83-12137*# IRT Corp., San Diego, Calif.
DEVELOPMENT OF ELECTRICAL TEST PROCEDURES FOR QUALIFICATION OF SPACECRAFT AGAINST EID. VOLUME 2: REVIEW AND SPECIFICATION OF TEST PROCEDURES Progress Report, Mar. - Sep. 1981
J. M. Wilkenfeld, B. L. Harlacher, and D. Mathews Apr. 1982 118 p refs 2 Vol.

(Contract NAS3-21967)
(NASA-CR-165590; NAS 1.26:165590; IRT-8195-022-1-Vol-2) Avail: NTIS HC A06/MF A01 CSCL 22B

A combined experimental and analytical program to develop system electrical test procedures for the qualification of spacecraft against damage produced by space-electron-induced discharges (EID) occurring on spacecraft dielectric outer surfaces is described. A review and critical evaluation of possible approaches to qualify spacecraft against space electron-induced discharges (EID) is presented. A variety of possible schemes to simulate EID electromagnetic effects produced in spacecraft was studied. These techniques form the principal element of a provisional, recommended set of test procedures for the EID qualification spacecraft. Significant gaps in our knowledge about EID which impact the final specification of an electrical test to qualify spacecraft against EID are also identified. Author

N83-12138*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THREE STAGE ROCKET VEHICLE WITH PARALLEL STAGING Patent Application
William R. Marshall, inventor (to NASA) Filed 30 Sep. 1982 16 p
(NASA-Case-MFS-25878-1; US-Patent-Appl-SN-431886) Avail: NTIS HC A02/MF A01 CSCL 22B

A three stage rocket vehicle has a large forward propellant tank and a small aft propellant tank axially aligned. Secured to the rear end of the aft propellant tank is an engine mount structure carrying rocket engines. Offset and secured to the propellant tanks is a payload structure. The propellants from the large forward tank are fed into the aft propellant tank and the rocket engines are fed propellants from the aft propellant tank. This arrangement enables the vehicle to parallel stage its use of engines and components and results in significant payload capability. The design and components fully utilize existing space shuttle elements and tooling. NASA

N83-12165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DURABILITY OF SPACECRAFT MATERIALS
Darrel R. Tenney *In its* Advan. Mater. Technol. Nov. 1982 p 357-380 refs (For primary document see N83-12147 03-23) Avail: NTIS HC A19/MF A01 CSCL 22B

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-12139# National Aerospace Lab., Tokyo (Japan).
EXPERIMENTS ON THE AFT-END IGNITION OF SOLID PROPELLANT ROCKET
Takashi Niioka, Tohru Mitani, Mamoru Takahashi, and Muneo Izumikawa 1982 22 p refs In JAPANESE; ENGLISH summary (NAL-TR-694; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Ignition experiments of the solid propellant rocket motor were made to obtain fundamental aspects of the aft end ignition performance. First, flame propagation phenomenon on the propellant surface (15 mm wide and 100 mm long) were investigated by changing the external gas flow velocity, composition and temperature. Secondly, the pressure histories during ignition of the 100 mm diameter rocket motor were measured for the fore end and the aft end igniter system. It is confirmed by these two experiments that the pressure output rate in the ignition transient of the rocket motor is closely related to the flame propagation speed, but not to the ignition, which is inherent in the propellant and is determined only by the amount of heat flux. The reason why the pressure rise of the aft end ignition is a low rate compared with the fore end ignition is explained by the difference of the propagation mechanism which may control the ignition performance of the motor. That is to say, flame propagation in the fore end ignition is performed by a forward (streamwise) propagation in which the directions of propagation and combustion gas flow are the same, but that in the aft end ignition is done by a backward (opposite) propagation. S.L.

N83-12140# National Aerospace Lab., Tokyo (Japan).
THE DEVELOPMENT AND STUDY OF THE TURBOPUMP SYSTEM FOR LOX AND LH2 ROCKET ENGINE
Kenjiro Kamijo, Hitoshi Yamada, Mitsuo Watanabe, Takashi Shimura, Masataka Nosaka, Yoshiaki Watanabe, Ryohei Hashimoto, Mineo Suzuki, Satoshi Hasegawa, and Masataka Kikuchi Jan. 1982 52 p refs In JAPANESE; ENGLISH summary (NAL-TR-696; ISSN-0389-4010) Avail: NTIS HC A04/MF A01

The development of an H-1 rocket engine turbopump system is reviewed. The turbopump system consists of a LOX turbopump, a LH2 turbopump, and a gas generator. Turbopump system testing was conducted. Full power closed loop operations of the turbopump system were successfully performed. The major problem in the testing was gas generator ignition troubles due to insufficient preconditioning of liquid oxygen feed lines. The results of the turbopump system testing are described. Author

N83-12141*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SIMPLIFICATION OF POWER ELECTRONICS FOR ION THRUSTER NEUTRALIZERS
Robert P. Gruber 1982 18 p refs Presented at the 16th Intern. Electric Propulsion Conf., New Orleans, 17-19 Nov. 1982
(NASA-TM-83004; E-1441; NAS 1.15:83004; AIAA-82-1880) Avail: NTIS HC A02/MF A01 CSCL 21C

A need exists for less complex and lower cost ion thruster systems. Design approaches and the demonstration of neutralizer power electronics for relaxed neutralizer keeper, tip heater, and vaporizer requirements are discussed. The neutralizer circuitry is operated from a 200 to 400 V bus and demonstrates an order of magnitude reduction in parts count. Furthermore, a new technique is described for regulating tip heater power and automatically switching over to provide keeper power with only four additional components. A new design to control the flow rate of the neutralizer with one integrated circuit is also presented. Author

N83-12142*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PARALLEL PLATE RADIOFREQUENCY ION THRUSTER
Shigeo Nakanishi Oct. 1982 12 p refs Presented at the 16th Intern. Electric Propulsion Conf., New Orleans, 17-19 Nov. 1982
(NASA-TM-83014; E-1432; NAS 1.15:83014) Avail: NTIS HC A02/MF A01 CSCL 21C

An 8-cm-diam. argon ion thruster is described. It is operated by applying 100 to 160 MHz RF power across a thin plasma volume in a strongly divergent static magnetic field. No cathode or electron emitter is required to sustain a continuous wave plasma discharge over a broad range of propellant gas flow. Preliminary results indicate that a large fraction of the incident power is being reflected by impedance mismatching in the coupling structure. Resonance effects due to plasma thickness, magnetic field strength, and distribution are presented. Typical discharge losses obtained to date are 500 to 600 W per beam ampere at extracted beam currents up to 60 mA. Author

N83-12143*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RAIL ACCELERATOR RESEARCH AT LEWIS RESEARCH CENTER
W. R. Kerslake and B. Z. Cybyk 1982 30 p refs Presented at the 16th Intern. Electric Propulsion Conf., New Orleans, 17-19 Nov. 1982
(NASA-TM-83015; E-1449; NAS 1.15:83015; AIAA-82-1938) Avail: NTIS HC A03/MF A01 CSCL 21C

A rail accelerator was chosen for study as an electromagnetic space propulsion device because of its simplicity and existing technology base. The results of a mission feasibility study using a large rail accelerator for direct launch of ton-size payloads from the Earth's surface to space, and the results of initial tests with a small, laboratory rail accelerator are presented. The laboratory rail accelerator has a bore of 3 by 3 mm and has accelerated 60 mg projectiles to velocities of 300 to 1000 m/s. Rail materials of Cu, W, and Mo were tested for efficiency and erosion rate. Author

N83-12144*# TRW, Inc., Redondo Beach, Calif. Defense and Space Systems Group.
INTEGRATED PROPULSION FOR NEAR-EARTH SPACE MISSIONS. VOLUME 1: EXECUTIVE SUMMARY Final Report, 29 Sep. 1980 - 29 Sep. 1981
C. L. Dailey, H. F. Meissinger, R. H. Lovberg, and S. Zafran Oct. 1981 27 p refs 2 Vol.
(Contract NAS3-22661)
(NASA-CR-167889; NAS 1.26:167889; TRW-37255-6001-UT-00-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 21C

Tradeoffs between electric propulsion system mass ratio and transfer time from LEO to GEO were conducted parametrically for various thruster efficiency, specific impulse, and other propulsion parameters. A computer model was developed for performing orbit transfer calculations which included the effects of aerodynamic drag, radiation degradation, and occultation. The tradeoff results showed that thruster technology areas for integrated prpulsion should be directed towards improving primary thruster efficiency in the range from 1500 to 2500 seconds, and be continued towards reducing specific mass. Comparison of auxiliary propulsion systems showed large total propellant mass savings with integrated electric auxiliary propulsion. Stationkeeping is the most demanding on orbit propulsion requirement. At area densities above 0.5 sq kg, East-West stationkeeping requirements from solar pressure exceed North-South stationkeeping requirements from gravitational forces. A solar array pointing strategy was developed to minimize the effects of atmospheric drag at low altitude, enabling electric propulsion to initiate orbit transfer at Shuttle's maximum cargo carrying altitude. Gravity gradient torques are used during ascent to sustain the spacecraft roll motion required for optimum solar array illumination. A near optimum cover glass thickness of 6 mils was established for LEO to GEO transfer. S.L.

N83-12145*# TRW, Inc., Redondo Beach, Calif. Defense and Space Systems Group.
INTEGRATED PROPULSION FOR NEAR-EARTH SPACE MISSIONS. VOLUME 2: TECHNICAL Final Report, 29 Sep. 1980 - 29 Sep. 1981
C. L. Dailey, H. F. Meissinger, R. H. Lovberg, and S. Zafran Oct. 1981 173 p refs 2 Vol.
(Contract NAS3-22661)
(NASA-CR-167889; NAS 1.26:167889; TRW-37255-6002-UT-00-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 21C

The calculation approach is described for parametric analysis of candidate electric propulsion systems employed in LEO to GEO missions. Occultation relations, atmospheric density effects, and natural radiation effects are presented. A solar cell cover glass tradeoff is performed to determine optimum glass thickness. Solar array and spacecraft pointing strategies are described for low altitude flight and for optimum array illumination during ascent. Mass ratio tradeoffs versus transfer time provide direction for thruster technology improvements. Integrated electric propulsion analysis is performed for orbit boosting, inclination change, attitude control, stationkeeping, repositioning, and disposal functions as well as power sharing with payload on orbit. Comparison with chemical auxiliary propulsion is made to quantify the advantages of integrated propulsion in terms of weight savings and concomittant launch cost savings. Author

N83-12146# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Analysis Lab.
LGM-30B, STAGE 2 DISSECTED MOTORS TEST REPORT
Daryl Anderson Jul. 1982 90 p refs
(AD-A118848; MANPA-471(82)) Avail: NTIS HC A05/MF A01 CSCL 21/8

This report contains the data obtained from testing propellant and case bond materials from four dissected Minuteman Stage 2 Motors. The directive specifies the tests required to elucidate any age induced problems which may affect the service life of the Stage 2 Motor. Linear regression analysis was used to indicate trends of the test parameters. A representative regression plot was made of several parameters with each motor tested to date identified by different symbols. The regression analysis normally verified the trends established during the last test phase. Although there were some trend changes either from or to significant status, it does not seem likely that any problems of major concern are apparent at this time. GRA

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-12147*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED MATERIALS TECHNOLOGY
Charles P. Blankenship, comp. and Louis A. Teichman, comp. Nov. 1982 438 p refs Proc. held at Hampton, Va., 16-17 Nov. 1982 Sponsored in cooperation with AIAA
(NASA-CP-2251; L-15537; NAS 1.55:2251) Avail: NTIS HC A19/MF A01 CSCL 11G

Composites, polymer science, metallic materials (aluminum, titanium, and superalloys), materials processing technology, materials durability in the aerospace environment, ceramics, fatigue and fracture mechanics, tribology, and nondestructive evaluation (NDE) are discussed. Research and development activities are introduced to the nonaerospace industry. In order to provide a convenient means to help transfer aerospace technology to the commercial mainstream in a systematic manner. For individual titles, see N83-12148 through N83-12169.

N83-12148*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPPORTUNITIES FOR COMPOSITES IN COMMERCIAL TRANSPORT STRUCTURES **c24**
Herman L. Bohon *In its* Advan. Mater. Technol. Nov. 1982 p 1-28 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

Manufacturers are developing composite versions of structural components on existing aircraft. Development involves testing of various material options before selecting one and then extensive testing to develop an adequate data base of material strength and stiffness properties. Design options are narrowed through analysis and a varied spectrum of development tests on small and large subcomponents. In parallel with this, a suitable production process including economical ply preparation and cure at high temperature and pressure is evolved, tools are designed and fabricated, and full scale components are then manufactured for ground qualification tests, flight tests, and airline service. The various tests include many that are required by the FAA for flight certification, which must precede airline service. Inspection and repair methods to insure adequate maintenance in service are also developed. S.L.

N83-12149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POLYMER RESEARCH AT NASA LANGLEY RESEARCH CENTER **c27**
Terry L. St.Clair and Norman J. Johnston *In its* Advan. Mater. Technol. Nov. 1982 p 29-48 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

Polymer synthesis programs involve the development of Novel thermoplastics, pseudothermoplastics, and thermosets. These systems are prepared to elucidate structure-property relationships involving thermal capabilities, toughness, processability and environmental stability. Easily processable polyimides, solvent-resistant polysulfones and polyphenylquinoxalines, and tougher high and intermediate temperature polymers were developed. Characterization efforts included high pressure liquid chromatography methodology, the development of toughness tests for fiber reinforced composites, a study of electrical properties of metal ion filled polyimides, and a study of the mutagenicity of aromatic diamines. Also the mechanism of cure/degradation of experimental polymers was studied by rheology, mechanical behavior, separation techniques and spectroscopy. The degradative crosslinking of alkyl-containing polyimides, the separation and identification of crosslinked phenylquinoxalines, the rheological behavior of hot-melt polyimides, and the elucidation of the cure of norbornene end-capped imides were also studied. S.L.

N83-12150*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
POLYMER MATERIALS RESEARCH AT NASA AMES RESEARCH CENTER **c27**
J. A. Parker, A. H. Heimbuch, and W. J. Gilwee *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 49-64 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

Polymers that provide significant improvements in both efficiency and safety for civilian transport aircraft and military combat aircraft were developed. High strength to weight structures such as carbon fiber composites with long term durability are requirements common to both classes of aircraft. Aircraft safety improvements in fire resistance and crashworthiness of primary and secondary structures are long term objectives for transport aircraft. Void filler ballistic foams, intumescent coatings, and radiation-resistant transparent plastics contribute to vulnerability reduction in combat military aircraft. Low and high velocity impact tolerance, fire resistance, thermal stability, and long term durability of polymers and components are emphasized. S.L.

N83-12151*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POLYMER MATRIX COMPOSITES RESEARCH AT NASA LEWIS RESEARCH CENTER **c27**
T. T. Serafini *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 65-90 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

The in situ polymerization of monomer reactants (PMR) approach was demonstrated to be a powerful approach for solving many of the processing difficulties associated with the use of high temperature resistant polymers as matrix resins in high performance composites. The PMR-15 polyimide provides the best overall balance of processing characteristics and elevated temperature properties. The excellent properties and commercial availability of composite materials based on PMR-15 led to their acceptance as viable engineering materials. The PMR-15 composites are used to produce a variety of high quality structural components. S.L.

N83-12152*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FATIGUE AND FRACTURE RESEARCH IN COMPOSITE MATERIALS **c24**
T. Kevin OBrien *In its* Advan. Mater. Technol. Nov. 1982 p 91-114 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

The fatigue, fracture, and impact behavior of composite materials are investigated. Bolted and bonded joints are included. The solutions developed are generic in scope and are useful for a wide variety of structural applications. The analytical tools developed are used to demonstrate the damage tolerance, impact resistance, and useful fatigue life of structural composite components. Standard tests for screening improvements in materials and constituents are developed. S.L.

N83-12153*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCESSING COMPOSITE MATERIALS **c24**
R. M. Baucom *In its* Advan. Mater. Technol. Nov. 1982 p 115-140 (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

The fabrication of several composite structural articles including DC-10 upper aft rudders, L-1011 vertical fins and composite biomedical appliances are discussed. Innovative composite processing methods are included. S.L.

N83-12154*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONSERVATION OF STRATEGIC METALS **c26**
Joseph R. Stephens *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 141-164 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

A long-range program in support of the aerospace industry aimed at reducing the use of strategic materials in gas turbine engines is discussed. The program, which is called COSAM (Conservation of Strategic Aerospace Materials), has three general objectives. The first objective is to contribute basic scientific understanding to the turbine engine technology bank so that our national security is not jeopardized if our strategic material supply lines are disrupted. The second objective is to help reduce the dependence of United States military and civilian gas turbine engines on worldwide supply and price fluctuations in regard to strategic materials. The third objective is, through research, to contribute to the United States position of preeminence in the world gas turbine engine markets by minimizing the acquisition costs and optimizing the performance of gas turbine engines. Three major research thrusts are planned: strategic element substitution; advanced processing concepts; and alternate material identification. Results from research and any required supporting technology will give industry the materials technology options it needs to make tradeoffs in material properties for critical components against the cost and availability impacts related to their strategic metal content. R.J.F.

N83-12155*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOLIDIFICATION PROCESS CONTROL FOR ADVANCED SUPERALLOYS **c26**
Hugh R. Gray and Robert L. Dreshfield *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 165-182 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

The importance of understanding and controlling the basic solidification process in high temperature alloy technology as applied to gas turbine engine production is discussed. Resultant tailoring of the superalloy macro- and microstructure offers significant potential for continued advances in superalloy use temperatures in turbine engines. Atomized superalloy powders, rapidly solidified superalloys, microstructural control, and advanced superalloys are discussed. R.J.F.

N83-12156*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCED POWDER METALLURGY ALUMINUM ALLOYS AND COMPOSITES **c26**
W. B. Lisagor and B. A. Stein *In its* Advan. Mater. Technol. Nov. 1982 p 183-200 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11F

The differences between powder and ingot metallurgy processing of aluminum alloys are outlined. The potential payoff in the use of advanced powder metallurgy (PM) aluminum alloys in future transport aircraft is indicated. The national program to bring this technology to commercial fruition and the NASA Langley Research Center role in this program are briefly outlined. Some initial results of research in 2000-series PM alloys and composites that highlight the property improvements possible are given. R.J.F.

N83-12157*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ADVANCES IN METALS PROCESSING **c26**

Thomas T. Bales and Dick M. Royster *In its* Advan. Mater. Technol. Nov. 1982 p 201-218 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11F

Research on metals processing being conducted to develop improved forming and joining methods with the potential of reducing the weight and cost of future aerospace structures is discussed. The approach followed is to assess the state of the art for fabricating a given structural system, define candidate methods for improving processing, evaluate the merits of each, fabricate and test subelement components, and then scale up the process to demonstrate validity. The development and the state of the art of weldbrazing, superplastic forming (SPF), superplastic forming and codiffusion bonding and superplastic forming and weldbrazing for titanium and the SPF of aluminum is discussed. R.J.F.

N83-12158*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FATIGUE AND FRACTURE RESEARCH IN METALS **c26**

J. C. Newman, Jr. and J. R. Davidson *In its* Advan. Mater. Technol. Nov. 1982 p 219-232 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11F

Fatigue and fracture research on monolithic and laminated metals is discussed. The research concentrated on three areas: stress analyses of two and three dimensional cracked bodies, fatigue crack growth, and fracture toughness. Analytical methods were developed to predict fatigue crack growth and fracture strengths of cracked specimens. Such specimens represent typical aircraft structural details (such as cracks from holes). These specimens were subjected to simple constant amplitude loading and to more complex flight load histories. Test data from both in house tests and from the literature are used to substantiate the analytical methods. These analyses extended the theory of fracture mechanics to deal with fatigue crack growth and fracture of complex crack configurations that are typical of aircraft materials and structural details. R.J.F.

N83-12159*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

HIGH-TEMPERATURE FATIGUE IN METALS **c26**

Gary R. Halford *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 233-260 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11F

The presentation focuses primarily on the progress we at NASA Lewis Research Center have made. The understanding of the phenomenological processes of high temperature fatigue of metals for the purpose of calculating lives of turbine engine hot section components is discussed. Improved understanding resulted in the development of accurate and physically correct life prediction methods such as Strain-Range Partitioning for calculating creep fatigue interactions and the Double Linear Damage Rule for predicting potentially severe interactions between high and low cycle fatigue. Examples of other life prediction methods are also discussed. R.J.F.

N83-12160*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

FIBROUS CERAMIC INSULATION **c27**

Howard E. Goldstein *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 261-274 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11C

Some of the reusable heat shielding materials used to protect the Space Shuttles, their manufacturing processes, properties, and applications are discussed. Emphases is upon ceramic materials. Space Shuttle Orbiter tiles are discussed. R.J.F.

N83-12161*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

RESEARCH ON ULTRA-HIGH-TEMPERATURE MATERIALS, MONOLITHIC CERAMICS, CERAMIC MATRIX COMPOSITES AND CARBON/CARBON COMPOSITES **c24**

T. J. Miller and H. H. Grimes *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 275-292 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11D

Research on three classes of materials that show potential for allowing significant increases in operating temperatures in gas turbine engines is discussed. Monolithic ceramics, ceramic matrix composites, and carbon-carbon composites are discussed. Sintering, hot pressing, and densification are discussed. R.J.F.

N83-12162*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RECENT ADVANCES IN CARBON-CARBON MATERIALS SYSTEMS **c24**

Donald R. Rummler *In its* Advan. Mater. Technol. Nov. 1982 p 293-312 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11D

Carbon-carbon materials and new oxidation resistant coating developments are discussed. Potential areas of application are highlighted. A short bibliography of selected references is included that describe carbon-carbon materials and related technology in detail. B.W.

N83-12163*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TURBINE ENGINE MATERIALS DURABILITY RESEARCH **c07**

S. R. Levine and C. A. Stearns *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 313-334 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 21E

High temperature environmental attack of dollar intensive turbine components reduces turbine efficiency and can limit life. The mechanisms of alloy and coating attack and the effects of interaction with the environment on mechanical behavior. This base of understanding provides the foundation for developing life prediction methods and identifying strategies for controlling attack. Subjects discussed in detail include oxidation and new developments in thermal barrier coating research. B.W.

N83-12164*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

DURABILITY OF AIRCRAFT COMPOSITE MATERIALS **c24**

H. Benson Dexter *In its* Advan. Mater. Technol. Nov. 1982 p 335-356 refs (For primary document see N83-12147 03-23)

Avail: NTIS HC A19/MF A01 CSCL 11D

Confidence in the long term durability of advanced composites is developed through a series of flight service programs. Service experience is obtained by installing secondary and primary composite components on commercial and military transport aircraft and helicopters. Included are spoilers, rudders, elevators, ailerons, fairings and wing boxes on transport aircraft and doors, fairings, tail rotors, vertical fins, and horizontal stabilizers on helicopters. Materials included in the evaluation are boron/epoxy, Kevlar/epoxy, graphite/epoxy and boron/aluminum. Inspection, maintenance, and repair results for the components in service are reported. The effects of long term exposure to laboratory, flight, and outdoor environmental conditions are reported for various composite

materials. Included are effects of moisture absorption, ultraviolet radiation, and aircraft fuels and fluids. B.W.

N83-12165*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DURABILITY OF SPACECRAFT MATERIALS **c18**
Darrel R. Tenney *In its* Advan. Mater. Technol. Nov. 1982 p 357-380 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 22B

Research efforts are reviewed on the space durability of materials, including radiation effects on polymer matrix composites and films, dimensional stability of polymer matrix composites and tension-stabilized cables, and thermal control coatings. Research to date has concentrated on establishing a fundamental understanding of space environmental effects on current graphite-reinforced composites and polymer systems, and development of analytical models to explain observed changes in mechanical, physical, and optical properties. As a result of these research efforts, new experimental facilities have been developed to simulate the space environment and measure the observed property changes. Chemical and microstructural analyses have also been performed to establish damage mechanisms and the limits for accelerated testing. The implications of these results on material selection and system performance are discussed and additional research needs and opportunities in the area of tougher resin/matrix and metal/matrix composites are identified. B.W.

N83-12166*# National Aeronautics and Space Administration, Washington, D. C.
MATERIALS PROCESSING IN SPACE
W. A. Oran *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 381-390 (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 22A

A brief overview of the current Materials Processing in Space Program is given, including a tentative schedule of flight experiments. Some recent results of processing materials (e.g., polymers and eutectic materials) in a microgravity environment are given, along with a discussion on additional proposed flight experiments. Ground-based results and the rationale for flight experimentation will be presented for other materials processes, including crystal growth. B.W.

N83-12167*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGY **c37**
Donald H. Buckley *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 391-410 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 20K

The adhesion, friction, and wear properties of materials are reviewed and some of the factors influencing these properties are discussed. The forms of lubrication and types of lubricants will also be discussed. B.W.

N83-12168*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FUNDAMENTALS OF ULTRASONIC NDE FOR MICROSTRUCTURE/MATERIAL PROPERTY INTERRELATIONS **c38**
A. Vary *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 411-420 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 14D

Some fundamental aspects of ultrasonic nondestructive evaluation for material properties and microstructure assessment are given. Ultrasonic wave interaction concepts, some recent findings, and practical ramifications are illustrated. The concepts are discussed in nonmathematical, narrative form. Additional information can be found in the references cited herein. B.W.

N83-12169*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCES IN NONDESTRUCTIVE EVALUATION TECHNOLOGY **c38**
Joseph S. Heyman *In its* Advan. Mater. Technol. Nov. 1982 p 421-440 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 14D

Research at NASA Langley's Materials Characterization Instrumentation Section has followed the philosophy of improving the science base of nondestructive evaluation and advancing the state of the art of quantitative interpretability of physical measurements of materials. Details of several R&D programs choosen to highlight the last several years are given. Applications of these technologies are presented in the area of stress measurement, characterization of metal heat treatment, and evaluation of material internal structure. A second focus of the program is on quantitative transducers/measurements that have resulted in better data in irregular inhomogeneous materials such as composites. Examples are presented of new capabilities resulting from these advances that include fatigue and impact damage evaluation. B.W.

N83-12170# Sandia Labs., Albuquerque, N. Mex.
FIRESET MATERIALS AGING STUDY Final Report
H. M. Smith (Bendix Corp., Kansas City, Mo.), C. Arnold, and M. E. Bailey Jul. 1982 108 p
(Contract DE-AC04-76DP-00613)
(DE82-020368; BDX-613-2791) Avail: NTIS HC A06/MF A01

Thermally accelerated aging of 10 selected organic materials used in a fireset was studied. The study included quantitative and qualitative gas analyses as well as the measurement of physical properties before and after accelerated aging. The test involved single material aging, as well as pairs and larger groups to look for synergistic interactions. The material types tested were: epoxies, polyurethanes, polysulfides, silicones, phenolics, polyolefins, and diallyl phthalates. Only two of the materials show degradation as a result of aging. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N83-12171# Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
CONCRETE COMPOSITES. FIBER REINFORCED POLYMER CONCRETES: PROPERTIES AND PRINCIPLES OF USE [KOMPOZYTY BECTONOWE SLATKO-FIBRO-POLIMEROBETONY WLASCIWOSCI I ZASADY STOSOWANIA]
1981 125 p refs In POLISH
(ISSN-0208-5658) Avail: Issuing Activity

Information and guidelines are provided concerning the structural properties, design, execution, and use of concrete composites as building materials. The guidelines are based on a critical analysis of materials included in both Polish and non-Polish technical publications. Emphasis is on the general characteristics of composite materials; the technological bases of fiber reinforced polymer concretes; the internal structure of composites; properties with significance for construction applications; theoretical and practical bases for determining internal strengths of construction elements of given weights; and the technical and economic justification for using fiber reinforced polymer concretes.
Transl. by J.D.

N83-12172# Aeronautical Research Labs., Melbourne (Australia).
STRESS ANALYSIS OF ADHESIVELY BONDED REPAIRS TO FIBRE COMPOSITE STRUCTURES
R. Jones, R. J. Callinan, and K. C. Aggarwal Mar. 1981 16 p refs
(ARL-Struc-Report-386; AR-002-275) Avail: NTIS HC A02/MF A01

The behavior of flaws in thin fiber composite sheets which are repaired with a bonded overlay is analyzed using a finite element method. The repair of a hole and a crack in various graphite/epoxy laminates is discussed and it is shown that in each case a bonded

overlay of either boron/epoxy or titanium provides an effective repair. S.L.

N83-12173*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A MODEL OF THE THERMAL-SPIKE MECHANISM IN GRAPHITE/EPOXY LAMINATES
Michael J. Adamson Oct. 1982 29 p refs
(NASA-TM-84299; A-8905; NAS 1.15:84299) Avail: NTIS HC A03/MF A01 CSCL 11D

The influence of a thermal spike on a moisture-saturated graphite/epoxy composite was studied in detail. A single thermal spike from 25 C to 132 C was found to produce damage as evidenced by a significant increase in the level of moisture saturation in the composite. Approximately half of this increase remained after a vacuum anneal at 150 C for 7 days, suggesting the presence of an irreversible damage component. Subsequent thermal spikes created less and less additional moisture absorption, with the cumulative effect being a maximum or limiting moisture capacity of the composite. These observations are explained in terms of a model previously developed to explain the reverse thermal effect of moisture absorption in epoxy and epoxy matrix composites. This model, based on the inverse temperature dependence of free volume, contributes an improved understanding of thermal-spike effects in graphite/epoxy composites. Author

N83-12174*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FAILURE CHARACTERISTICS OF GRAPHITE-EPOXY STRUCTURAL COMPONENTS LOADED IN COMPRESSION
James H. Starnes, Jr. and Jerry G. Williams Sep. 1982 26 p refs Presented at the IUTAM Symp. on Mech. of Composite Mater., Blacksburg, Va., 16-19 Aug. 1982
(NASA-TM-84552; NAS 1.15:84552) Avail: NTIS HC A03/MF A01 CSCL 11D

Failure characteristics of compressively loaded graphite-epoxy components are described. Experimental results for both strength-critical laminates and structural components with postbuckling strength are presented. Effects of low speed impact damage and circular holes on compressive strength are discussed. Delamination and shear crippling failure mechanisms that limit the performance of strength-critical laminates are described. Transverse shear and skin-stiffener separation failure mechanisms that limit the performance of components with postbuckling strength are also described. The influence of matrix properties on compressive strength improvements for impact damaged laminates is discussed. Experimental data and results from a failure analysis for strength-critical laminates with cutouts are discussed and compared with impact damage results. Typical postbuckling test results are compared with analytical predictions. Author

N83-12175*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PMR-15 POLYIMIDE MODIFICATIONS FOR IMPROVED PREPREG TACK
Raymond D. Vannucci 1982 13 p refs Presented at the Natl. Tech. Conf. of the Soc. of Plastic Engr., Bal Harbour, Fla., 25-27 Oct. 1982
(NASA-TM-82951; E-1361; NAS 1.15:82951) Avail: NTIS HC A02/MF A01 CSCL 11D

The use of mixed solvents and of modified monomeric ester reactants was investigated as a means of improving the tack and drape retention characteristics of PMR-15 polyimide prepreg. Methanol, ethanol, 1-propanol and 1-butanol were used to prepare the esters, prepreg solutions, and T-300 graphite fabric and Celion 6000 unidirectional fiber prepregs. The tack retention characteristics of the T-300 fabric prepreg after exposure to simulated use conditions were determined using a simple lap shear test. Drape was qualitatively assessed by visually monitoring the deformability of the prepreg. Thermo-oxidative stability and mechanical properties retention of the Celion 6000 grahite fiber composites were determined as a function of exposure time in air at 600 F. Author

N83-12176*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METHOD AND APPARATUS FOR GRIPPING UNIAXIAL FIBROUS COMPOSITE MATERIALS Patent Application
J. D. Whittenberger and F. I. Hurwitz, inventors (to NASA) Filed 15 Sep. 1982 11 p
(NASA-Case-LEW-13758-1; US-Patent-Appl-SN-418139) Avail: NTIS HC A02/MF A01 CSCL 11D

A strip specimen is cut from a unidirectional strong, brittle fiber composite material, and the surfaces of both ends of the specimen are grit-blasted. The specimen is then placed between metal load transfer members having grit-blasted surfaces. Sufficient compressive stress is applied to the load transfer members to prevent slippage during testing at both elevated temperatures and room temperatures. The need for adhesives, load pads, and other secondary composite processing is eliminated. This gripping system was successful in tensil testing, creep-rupture testing, and fatigue testing uniaxial composite materials at 316 C. NASA

N83-12177# McDonnell Aircraft Co., St. Louis, Mo. Material and Process Development Dept.
PHYSIOCHEMICAL/RHEOLOGICAL CONTROL OF NONMETALLIC MATERIALS Final Technical Report, 1 Aug. 1981 - 1 Aug. 1982
James F. Carpenter Aug. 1982 51 p
(Contract N00019-81-C-0119)
(AD-A118590) Avail: NTIS HC A04/MF A01 CSCL 11/4

The objective of this program has been to evaluate the use of physiochemical and rheological methods to improve the quality control nonmetallic consumables used in the bonding and production of composites and also the quality control of foaming adhesives. Author (GRA)

N83-12178# Texas A&M Univ., College Station. Dept. of Mathematics.
THEORETICAL QUESTIONS CONCERNING CONTACT AND FRACTURE PHENOMENA FOR ELASTIC AND VISCOELASTIC MATERIAL AND ASSOCIATED METHEMATICAL TECHNIQUES Final Scientific Report, 1 Apr. 1977 - 31 Mar. 1982
Jay R. Walton Mar. 1982 14 p refs
(Grant AF-AFOSR-3290-77; AF Proj. 2304)
(AD-A118579; AFOSR-82-0647TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

This report summarizes progress on several theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material. Specifically, the following topics are discussed: (1) quasi-static sliding contact problems for power-law linearly viscoelastic material; (2) the quasi-static propagation of a crack by a rigid wedge through an infinite power-law linearly viscoelastic body; (3) solution techniques of systems for generalized Abel integral equations with application to simultaneous sets of dual integral equations and interfacial cracks in elastic material; (4) the application of conservation integral techniques to the calculation of energy release rates for elastic interfacial edge cracks; (5) static thermo-elastic interfacial edge cracks; and (6) the dynamic, steady-state fracture of general linearly viscoelastic material. Author (GRA)

N83-12179# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
STIFFNESS REDUCTION RESULTING FROM TRANSVERSE CRACKING IN FIBER-REINFORCED COMPOSITE LAMINATES
Alton Lee Highsmith Nov. 1981 100 p refs
(PB82-179011; VIP-E-81-33) Avail: NTIS HC A05/MF A01 CSCL 11D

The effect of transverse cracking on laminates stiffness was studied. Four glass-epoxy laminates were evaluated. Two experimental test sequences were performed. In the first test sequence, longitudinal stiffness was measured at various stages of damage development. Damage development was monitored via edge replication. In the second test sequence, four laminate stiffness were measured in the undamaged and near-saturation damage states. Two analytical models were evaluated. A one dimensional

shear lag model was used to predict longitudinal stiffness as a function of crack density. Correlation between theory and experimental was good. A modified laminate analysis was used to predict four laminate stiffnesses. GRA

N83-12148*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPPORTUNITIES FOR COMPOSITES IN COMMERCIAL TRANSPORT STRUCTURES
Herman L. Bohon *In its* Advan. Mater. Technol. Nov. 1982 p 1-28 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

N83-12152*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FATIGUE AND FRACTURE RESEARCH IN COMPOSITE MATERIALS
T. Kevin OBrien *In its* Advan. Mater. Technol. Nov. 1982 p 91-114 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

N83-12153*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PROCESSING COMPOSITE MATERIALS
R. M. Baucom *In its* Advan. Mater. Technol. Nov. 1982 p 115-140 (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

N83-12161*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RESEARCH ON ULTRA-HIGH-TEMPERATURE MATERIALS, MONOLITHIC CERAMICS, CERAMIC MATRIX COMPOSITES AND CARBON/CARBON COMPOSITES
T. J. Miller and H. H. Grimes *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 275-292 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

N83-12162*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RECENT ADVANCES IN CARBON-CARBON MATERIALS SYSTEMS
Donald R. Rummler *In its* Advan. Mater. Technol. Nov. 1982 p 293-312 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

N83-12164*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DURABILITY OF AIRCRAFT COMPOSITE MATERIALS
H. Benson Dextern *In its* Advan. Mater. Technol. Nov. 1982 p 335-356 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11D

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-12180# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FLAME PROPAGATION ANALYSIS OF WATER-ALCOHOL MIXTURES
Katsumi Hiramatsu and Demetrio Bastos-Netto Oct. 1982 14 p refs Submitted for publication
(INPE-2548-PRE/205) Avail: NTIS HC A02/MF A01

The one dimensional spread of flame across the surface of alcohol confined in a vessel was studied under atmosphere conditions. The effects that the liquid initial temperature and water content exert on the combustion were investigated theoretically based on the preheating concept. It is shown that, invoking the dependence of the specific heat and density of the air vapor flammable equilibrium layer with the liquid temperature, the flame propagation velocity varies slightly with the water content and it reaches its maximum at a certain liquid temperature. S.L.

N83-12181*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A SOFTWARE SYSTEM FOR EMISSION SPECTROMETRY
J. V. Auping and R. G. Megargle (Cleveland State Univ., Ohio) [1981] 12 p refs Presented at the 9th Meeting of the Federation of Analytical Chem. and Spectry. Soc., Philadelphia, 19-24 Sep. 1982
(NASA-TM-83001; E-1437; NAS 1.15:83001) Avail: NTIS HC A02/MF A01 CSCL 07D

A computer system was developed for an emission spectrometry facility consisting of a direct current (DC) argon arc spectrograph optically coupled to an inductively coupled plasma multichannel spectrometer. Custom hardware and software were designed to control analytical functions and perform data acquisition. The software system was designed to make operation of the facility simple for routine operation and flexible for research and development. Special software was written to collect data under controlled conditions to characterize and monitor system response. One sequence collects intensity versus time data on all channels and displays the data graphically. These profiles are useful in studying the effects of operating parameters on measurement precision. Another special sequence performs calibration using a spline curve fit procedure. Routines were also written to measure dark currents and signals from a standard tungsten halogen lamp mounted in place of the DC arc. For quality control purposes, histories of these values are kept and monitored for excess scatter or drift. Author

N83-12182*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SHOCK TUBE MEASUREMENTS OF GROWTH CONSTANTS IN THE BRANCHED CHAIN FORMALDEHYDE-CARBON MONOXIDE-OXYGEN SYSTEM
Theodore A. Brabbs and Richard S. Brokaw (Baldwin-Wallace Coll.) Sep. 1982 16 p refs
(NASA-TM-82954; E-1371; NAS 1.15:82954) Avail: NTIS HC A02/MF A01 CSCL 07D

Exponential free radical growth constants were measured for formaldehyde carbon monoxide-oxygen systems by monitoring the growth of oxygen atom concentration as manifested by CO flame band emission. Data were obtained over the temperature range of 1200 to 2000 K. The data were analyzed using a formaldehyde oxidation mechanism involving 12 elementary reaction steps. The computed growth constants are roughly in accord with experimental values, but are much more temperature dependent. The data was also analyzed assuming formaldehyde is rapidly decomposed to carbon monoxide and hydrogen. Growth constants computed for the resulting carbon monoxide hydrogen oxygen mixtures have a temperature dependence similar to experiments; however, for most mixtures, the computed growth constants were larger than experimental values. S.L.

N83-12183# Georgia Inst. of Tech., Atlanta. Molecular Sciences Branch.
THE KINETICS AND SPECTROSCOPY OF AIRCRAFT AND ROCKET PLUME CONSTITUENTS Final Technical Report, 1 Jun. 1977 - 30 Sep. 1980
F. P. Tully and A. R. Ravishankara 10 Dec. 1980 86 p refs
(Contract F49620-77-C-0011; Grant NBS-GT-9020; AF Proj. 2308)
(AD-A118482; AFOSR-82-0624TR) Avail: NTIS HC A05/MF A01 CSCL 21/2

During the course of this program experimental investigations were carried out to meet two objectives: (1) to measure the temperature dependence of rate coefficients of radical-molecule and molecule-molecule reactions of specific importance in modeling of combustion and plume processes, and (2) to contribute to the

general understanding of the temperature dependence of bimolecular reactions, particularly as it relates to observed curvature in Arrhenius plots. GRA

N83-12184# Hull Univ. (England). Dept. of Chemistry.
KINETICS OF HYDROGEN-OXYGEN AND HYDROCARBON-OXYGEN REACTIONS Final Scientific Report, 1 Apr. 1977 - 30 Jun. 1981
Robert R. Baldwin and Raymond W. Walker Aug. 1981 69 p refs
(Grant AF-AFOSR-3215-77; AF Proj. 2308)
(AD-A118540; AFOSR-82-0623TR) Avail: NTIS HC A04/MF A01 CSCL 07/3

Rate constants of the H2 + 02 reaction at 500 C have been refined. Rate constants and Arrhenius parameters for reactions of H atoms and OH radicals with C2-C5 alkanes, 2,2,3,3-tetramethylbutane (TMB) and 2,2,3-trimethylbutane (TRIMB) have been obtained. Detailed studies have been made of the products from the oxidation of 1-butane, n-pentane, neopentane, TMB and TRIMB. Rate constants for R + 02 = conjugate alkene, for homolysis of R Radicals, and for the isomerisation of R02 radicals to hydroperoxyalkyl radicals have been tabulated for a range of radicals. GRA

N83-12185# Alberta Univ., Edmonton. Dept. of Chemistry.
ORTHOGONAL COLLOCATION SIMULATION OF THE ROTATING DISC ELECTRODE
Bernd Speiser, Stanley Pons, and Jerome McAleer 18 Aug. 1982 10 p refs Submitted for publication
(Grant N00014-82-G-0017; NR Proj. 359-718)
(AD-A118712; TR-12) Avail: NTIS HC A02/MF A01 CSCL 07/4

The theory of orthogonal collocation as applied to rotating disc systems is presented and its advantages are described. The technique is extremely fast and application of chemical reactions is easily implemented. Author (GRA)

N83-12186# Alberta Univ., Edmonton. Dept. of Chemistry.
VIBRATIONAL SPECTROSCOPY OF THE ELECTRODE-SOLUTION INTERPHASE. 2. USE OF FTIR SPECTROSCOPY FOR RECORDING IR SPECTRA OF RADICAL ION INTERMEDIATES
Stanley Pons, Timothy Davidson, and Alan Bewick (The Univ., Southampton, UK) 18 Aug. 1932 12 p refs Submitted for publication
(Grant N00014-82-G-0017; NR Proj. 359-718)
(AD-A118705; TR-15) Avail: NTIS HC A02/MF A01 CSCL 07/4

Results for the recording of the radical ions formed in the reduction of benzophenone, tetracyanoethylene and anthracene are presented. Author (GRA)

N83-12187# Alberta Univ., Edmonton. Dept. of Chemistry.
SIMULATION OF THE DROPPING MERCURY ELECTRODE BY ORTHOGONAL COLLOCATION
Stanley Pons, Bernd Speiser, Jerome McAleer, and P. P. Schmidt (Oakland Univ., Rochester) 18 Aug. 1982 13 p refs Submitted for publication
(Grant N00014-82-G-0017; NR Proj. 359-718)
(AD-A118689; TR-13) Avail: NTIS HC A02/MF A01 CSCL 07/4

The theory for the application of orthogonal collocation techniques to the dropping mercury electrode is given. The technique is shown to adapt readily to non-linear geometries. Author (GRA)

N83-12188# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
HIGH TEMPERATURE CATALYTICALLY ASSISTED COMBUSTION Final Report, 1 Jun. 1980 - 31 May 1981
C. Bruno, F. V. Bracco, B. S. H. Royce, and P. M. Curtis Aug. 1981 64 p refs
(Grant AF-AFOSR-3052-76; AF Proj. 2308)
(AD-A118641; AFOSR-82-0666TR) Avail: NTIS HC A04/MF A01 CSCL 21/2

Measurements of catalytic combustion of lean mixtures of propane/air at atmospheric pressure over platinum/alumina/cordierite catalysts were carried out over a broad range of equivalence ratios and flow velocities. Substrate (honeycomb) temperatures, chemical species at the catalyst were measured. A substantial data base for catalytic oxidation C3H8 over platinum catalysts was obtained. A two-dimensional model of the gas-phase oxidation of propane was developed. When the experimental wall temperature is used as the boundary condition for the gas-phase reactions; emissions predicted from the model agree well with measured values. From comparison with the experimental data, indications are that propane oxidation takes place via a three-step kinetic mechanism. Also from study of the relative importance of gas-phase vs. surface oxidation, conclusions are that most of the propane is burnt in the gas-phase rather than at the catalytic wall and that the wall kinetics is slower than the gas diffusion transplant. Author (GRA)

N83-12189# Illinois Univ., Urbana. Dept. of Chemistry.
CHEMILUMINESCENCE FROM THE REATION OF 2-METHYLENE-3-ACETYLOXAZOLINE-4,5-DIONE WITH HYDROGEN PEROXIDE
Daniel Steffek, Robert C. Mebane, and Gary B. Schuster 20 Aug. 1982 13 p refs Submitted for publication
(Contract N00014-76-C-0745; NR Proj. 051-616)
(AD-A118782; N00014-76-C-0745-33) Avail: NTIS HC A02/MF A01 CSCL 07/4

The reaction of 2-methylene-3-acetyloxazoline-4,5-dione (1) with hydrogen peroxide in the presence of a fluorescent aromatic hydrocarbon generates light. The mechanism for light generation was investigated and found to parallel that of oxalate esters. The reaction of dione (1) is catalyzed by added base, but the chemiluminescence intensity drops as the base concentration increases. A reaction sequence is proposed consistent with the experimental observations. GRA

N83-12190# Monsanto Research Corp., Dayton, Ohio.
COLORIMETRIC OIL ANALYSIS FOR TITANIUM Final Report, 13 Jul. - 30 Sep. 1981
William J. Hillan, Mark T. Wininger, and William D. Ross Wright-Patterson AFB, Ohio AFWAL Mar. 1982 35 p refs
(Contract F33615-81-C-2073; AF Proj. 3048)
(AD-A118445; MRC-DA-1101; AFWAL-TR-81-2138) Avail: NTIS HC A03/MF A01 CSCL 11/8

The goal of this research contract was to develop a rapid flight-line method compatible with the Colorimetric Iron Kit for assessing the titanium content in used jet engine lubricating oil. A colorimetric method capable of analyzing for up to 20 ppm titanium was developed for this purpose. The method extracts the titanium from the oil into an aqueous phase where it is complexed with TIRON to form a yellow color indicative of the titanium concentration. The titanium concentration can be quantitated by measuring the yellow aqueous layer with a spectrophotometer or colorimeter at 400 micrometers. Author (GRA)

N83-12191# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy Div.
DEVELOPMENT OF AN ION MASS SPECTROMETER AND SOUNDING ROCKET SYSTEM FOR D-REGION CLUSTER-ION MEASUREMENTS Final Scientific Report
A. Bailey, R. Narcisi, L. Wlodyka, G. Federico, and E. McKenna 27 Jan. 1982 105 p refs
(AF Proj. 2310)
(AD-A118752; AFGL-TR-82-0022; AFGL-IP-309) Avail: NTIS HC A06/MF A01 CSCL 07/4

An Ion Mass Spectrometer and supporting Sounding Rocket System were developed to make in situ measurements of cluster-ions in the D-region of the ionosphere. A cryogenically vacuum-pumped quadrupole mass filter and secondary emission ion counter are coupled to make mass spectral measurements of positive and negative ion composition in ambient gas sampled at the apex

of a cone designed to attach the shock wave induced by supersonic sounding rocket speeds. Author (GRA)

N83-12192# Illinois Univ., Urbana. Dept. of Chemistry.
SINGLET-OXYGENATION OF A CONJUGATED DIALLENE: ATTEMPT TO PREPARE A STABLE DIVINYL PEROXIDE
Robert C. Mebane and Gary B. Schuster 20 Aug. 1982 17 p refs Submitted for publication Sponsored in part by the Petroleum Research Fund
(Contract N00014-76-C-0745; NR Proj. 051-316)
(AD-A118772; TR-34) Avail: NTIS HC A02/MF A01 CSCL 07/3

A conjugated diallene, 2-3-divinylidenebicyclo(2.2.1)heptane, was prepared and isolated. Photosensitized oxygenation of this allene leads to two isolated oxygenated products in 50% yield. Detection of these products is interpreted to implicate an unstable cyclic divinyl peroxide intermediate. Attempts to detect this intermediate by low temperature nmr spectroscopy and by chemiluminescence were unsuccessful. The instability of this compound is attributed to the destabilizing lone pair interaction of the peroxide oxygen atoms. Author (GRA)

N83-12193# Alberta Univ., Edmonton. Dept. of Chemistry.
SIMULATION OF EDGE EFFECTS IN ELECTROANALYTICAL EXPERIMENTS BY ORTHOGONAL COLLOCATION. PART 1. TWO DIMENSIONAL COLLOCATION AND THEORY FOR CHRONOAMPEROMETRY
Bernd Speiser and Stanley Pons 18 Aug. 1982 10 p refs Submitted for publication
(Grant N00014-82-G-0017; NR Proj. 359-718)
(AD-A118708; TR-8) Avail: NTIS HC A02/MF A01 CSCL 07/4

The details for accurate simulation of edge effects experienced at disc electrodes in chronoamperometric experiments is given. GRA

N83-12194# Alberta Univ., Edmonton. Dept. of Chemistry.
VIBRATIONAL SPECTROSCOPY OF THE ELECTRODE-SOLUTION INTERPHASE. 3: USE OF FTIR SPECTROSCOPY FOR OBSERVING DOUBLE LAYER REORGANIZATION
Stanley Pons, Timothy Davison, and Alan Bewick (Southampton Univ., Engl.) 18 Aug. 1982 9 p refs Submitted for publication 4 Vol.
(Contract N00014-82-G-0017; NR Proj. 359-718)
(AD-A118706; TR-10) Avail: NTIS HC A02/MF A01 CSCL 07/4

Results are presented for experiments designed to observe structural changes in the electrical double layer under different potential modulations. Results are presented for non-aqueous systems in this report. GRA

N83-12195# Alberta Univ., Edmonton. Dept. of Chemistry.
VIBRATIONAL SPECTROSCOPY OF THE ELECTRODE-SOLUTION INTERPHASE. 4: FTIR - EXPERIMENTAL CONSIDERATIONS
Stanley Pons, Timothy Davidson, and Alan Bewick (Southampton Univ., Engl.) 18 Aug. 1982 14 p refs Submitted for publication 4 Vol.
(Contract N00014-82-G-0017; NR Proj. 359-718)
(AD-A118707; TR-16) Avail: NTIS HC A02/MF A01 CSCL 07/4

The experimental details for the gathering of high quality infrared spectra in the electrode-solution interphase are given. GRA

N83-12196# Alberta Univ., Edmonton. Dept. of Chemistry.
SIMULATION OF EDGE EFFECTS IN ELECTROANALYTICAL EXPERIMENTS BY ORTHOGONAL COLLOCATION. PART 2: THE THEORY FOR CYCLIC VOLTAMMETRY BY COLLOCATION
Bernd Speiser and Stanley Pons 18 Aug. 1982 21 p refs Submitted for publication 4 Vol.
(Contract N00014-82-G-0017; NR Proj. 359-718)
(AD-A118709; TR-9) Avail: NTIS HC A02/MF A01 CSCL 07/4

The procedure and theory for simulation of currents perturbed by edge effects at disc electrodes in cyclic voltammetric experiments is presented. The results are obtained rapidly and accurately. GRA

N83-12197# Alberta Univ., Edmonton. Dept. of Chemistry.
SIMULATION OF EDGE EFFECTS IN ELECTROANALYTICAL EXPERIMENTS BY ORTHOGONAL COLLOCATION. PART 3: APPLICATION TO CHRONOAMPEROMETRIC EXPERIMENTS
Bernd Speiser and Stanley Pons 18 Aug. 1982 22 p refs Submitted for publication 4 Vol.
(Contract N00014-82-G-0017; NR Proj. 359-718)
(AD-A118710; TR-14) Avail: NTIS HC A02/MF A01 CSCL 07/4

Comparisons of simulated results with theory for chronoamperometric systems is presented. Results for complicated systems are obtained with high accuracy in very short periods of time.GRA

N83-12198# Alberta Univ., Edmonton. Dept. of Chemistry.
ELECTROANALYTICAL INVESTIGATIONS. PART 4: USE OF ORTHOGONAL COLLOCATION FOR THE SIMULATION OF QUASIREVERSIBLE ELECTRODE PROCESSES UNDER POTENTIAL SCAN CONDITIONS
Bernd Speiser, Stanley Pons, and Anton Rieker (Inst. fuer Organische Chemie, Tubengin, West Germany) 18 Aug. 1982 15 p refs Submitted for publication Sponsored in part by Alberta Univ., and Deutsche Forschungemeinsschaft 4 Vol.
(Contract N00014-82-G-0017; NR Proj. 359-718)
(AD-A118711; TR-11) Avail: NTIS HC A02/MF A01 CSCL 07/4

The procedure for simulating quasireversible electron transfer systems for cyclic voltammetry experiments is presented, and the procedure applied to several systems. The technique is based on orthogonal collocation. Author (GRA)

N83-12199# AeroChem Research Labs., Inc., Princeton, N. J.
SOOT FORMATION IN SYNFUELS Quarterly Report, 1 Apr. - 30 Jun. 1981
D. B. Olson Nov. 1981 22 p refs
(Contract DE-AC22-80PC-30304)
(DE82-004271; DOE/PC-30304/3; TN-22; QR-3) Avail: NTIS HC A02/MF A01

The effects of fuel molecular structure, flame temperature, and pressure on soot production in laboratory flames of selected synfuel component hydrocarbons are discussed. The threshold sooting index, flame temperature, and soot concentration in premixed and diffusion flames of approximately 50 fuel components were measured. A fuel vaporizer system was constructed, solving a significant problem in the emission pyrometer. Soot concentration measurements using a near IR light extinction technique were made. Experiments on a C2H2/O2 flame to provide an absolute calibration for flame ion concentration measurements were done and modifications to the mass spectrometer system for sampling from high pressure flames were made. DOE

N83-12200# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
FUNDAMENTAL AIR-GASIFICATION ENGINEERING PARAMETERS Annual Report for fiscal year 1981
Raymond Desrosiers Feb. 1982 24 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021612; SERI/PR-234-1470) Avail: NTIS HC A02/MF A01

A mathematical simulation of an air-blown, updraft gasifier was used to study the effect of char reactivity, particle size, and steam rate on the temperature and composition profiles in the bed of a reactor. The results are insensitive to the rate assumed for the reaction of char with oxygen since this reaction appears to be diffusion limited. For a dry air blast, the maximum temperature achieved is determined chiefly by the rate of the char-CO2 reaction, which is a feed-dependent parameter. The rate of char combustion reaction is inversely proportional to D sub p (1.6), where D sub p is the particle diameter, while the char-CO2 and char-steam

reactions are inversely proportional to D sub p. Since the maximum temperature is strongly dependent on any parameter which affects the balance of these two sets of reactions, the particle size is a very sensitive variable. The minimum overall bed length required for complete char conversion is found to vary quadratically with D sub p. In the range of 1000 C, the temperature does not vary monotonically with steam rate as expected. DOE

N83-12201# Department of Energy, Grand Forks, N. Dak. Energy Technology Center.
LIQUEFACTION BEHAVIOR OF AN AUSTRALIAN BROWN COAL IN COMPARISON TO THAT OF TWO US LIGNITES
G. G. Baker, W. G. Willson, C. L. Knudson, S. A. Farnum, and B. W. Farnum Sep. 1982 35 p
(DE82-021977; DOE/GFETC/RI-82/2) Avail: NTIS HC A03/MF A01

Data presented in this report suggest the following major conclusions: (1) The Australian brown coal (predried to 10 pct moisture), at the conditions tested, resulted in lower yields than any of the US lignites or subbituminous coals tested thus far. (2) Distillate yield from the Australian coal was increased by continuous process unit bottoms recycle operation with syngas although not increased to the same level observed for North Dakota or Texas lignites processed at similar conditions, but with hydrogen. (3) The Australian coal responded to changes in operating conditions in a manner similar to North Dakota lignites; however, the total conversion and yields were always less. (4) The Australian coal tested appears to have been deactivated during the drying process, which is known to happen to US lignites dried in the presence of air or inert gas. DOE

N83-12202# Department of Energy, Bartlesville, Okla. Energy Technology Center.
AUTOMATED PROBE MICRODISTILLATION/MASS SPECTROMETRY FOR THE ANALYSIS OF HIGH-MOLECULAR WEIGHT COMPOUNDS IN FOSSIL FUELS
S. E. Scheppele, Q. G. Grindstaff, R. D. Grigsby, K. C. Chung, C. S. Hwang, T. D. Marriott, and L. R. Schronk Aug. 1982 24 p refs
(PB82-022039; DOE/BETC/TPR-82/1) Avail: NTIS HC A02/MF A01

Automated probe microdistillation/mass spectroscopy is described. The application of computer hardware and the development of computer software eliminate the dilatory nature of acquiring both the temperature and associated mass spectra and reduces the acquired data for processing. The interaction of various hardware components of the system as well as the associated software is described. DOE

N83-12203# California Univ., Livermore. Lawrence Livermore Lab.
GAMIDEN: A PROGRAM TO AID IN THE IDENTIFICATION OF UNKNOWN MATERIALS BY GAMMA-RAY SPECTROSCOPY
R. J. Howerton 25 Jun. 1982 14 p
(Contract W-7405-eng-48)
(DE82-021960; UCRL-50400-Vol-22-Rev-1) Avail: NTIS HC A02/MF A01

The intent of the computer code GAMIDEN is to help identify isotopes by their gamma-ray emissions and thus to assist in the nondestructive assay of unknown materials. From both radioactive decays and neutron captures, GAMIDEN searches GAMTOT78, a file of gamma-ray spectra, for matches with observed photon energies. The search procedure is discussed and the use of the code is described. The code is designed to operate on the CRAY 1 computer at Lawrence Livermore National Laboratory. It is written in standard FORTRAN for the most part but contains some LRLTRAN instructions to make use of the Livermore time-sharing system. The code uses about 545,000 words of memory. Typical problems run in about 45 s. The source program and the data file are available on request. DOE

N83-12204# National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
FLUIDISED-BED COMBUSTION: COMBUSTION OF RUN-OF-MINE COAL IN A 12-INCH-DIAMETER PRESSURIZED FLUIDISED-BED COMBUSTOR
K. K. Pillai, S. N. Barker, and A. G. Roberts 1981 76 p refs
(Contract DE-AC21-80MC-14129)
(DE82-018786; DOE/MC-14129/1208) Avail: NTIS HC A05/MF A01

Direct feeding of run-of-mine coal into a pressurized-fluidized bed combustor was performed at the Coal Utilization Research Laboratory; Leatherhead, United Kingdom (U.K.). A twelve-inch diameter rig was operated at 6 atmosphere pressure and 16500 F for a period of eighteen hours. Two coals were used, i.e., a U.K. washed coal for initial proving tests and a Pittsburgh No. 8 coal, both sized one inch to zero. Results were encouraging and are presented. DOE

N83-12205# Bureau of Mines, Pittsburgh, Pa.
THE THEORY OF FLAMMABILITY LIMITS. RADIATIVE LOSSES AND SELECTIVE DIFFUSIONAL DEMIXING
Martin Hertzberg Feb. 1982 44 p refs
(PB82-193178; BM-RI-8607) Avail: NTIS HC A03/MF A01 CSCL 21B

The concept of limit burning velocities is being used to formulate a quantitative theory of flammability limits. Competing and complicating processes dissipate power from a combustion wave and quench propagation at some characteristically low limit velocity. This report considers radiative losses and selective diffusional demixing. Author (GRA)

N83-12206# Oak Ridge National Lab., Tenn. Chemical Technology Div.
PHOTOSYNTHETIC WATER SPLITTING Annual Report, Jan. - Dec. 1981
Elias Greenbaum Jan. 1982 21 p refs
(Contract GRI-5080-361-0368)
(PB82-200684; GRI-81/0036; ORNL/TM-8320) Avail: NTIS HC A02/MF A01 CSCL 07D

The basic physics and chemistry of photosynthetic hydrogen and oxygen production are examined. During this reporting period, the first measurements of the turnover times and photosynthetic unit sizes of steady state simultaneous photoproduction of hydrogen and oxygen have been determined. The results for the turnover times are encouraging because they demonstrate that the values for the hydrogen and oxygen photoreactions are kinetically compatible and are about the same as the turnover times for normal photosynthesis. The major limiting aspect of the hydrogen and oxygen photoreactions is the number of apparent functional photosynthetic units. Studies on the long-term stability and endurance of hydrogen and oxygen photoproduction in anaerobically adapted green algae have also been performed. Preliminary results indicate that these organisms are extremely rugged and may be of eventual use in practical applications. GRA

N83-12207# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.
THERMODYNAMIC DATA FOR DESULFURIZATION PROCESSES Final Report
V. B. Parker, B. R. Staples, T. L. Jobe, Jr., and D. B. Neumann Sep. 1981 92 p refs
(Contract DE-AI21-80-MC14004)
(PB82-184904; NBSIR-81-2345) Avail: NTIS HC A05/MF A01 CSCL 07D

Values of thermochemical properties and processes at 298.15 K for flue gas desulfurization are presented. The substances covered are: (1) the aqueous ions: OH(-), SO3(-2), HSO3(-1) SO4(-4), CO3(-2) HCO3(-), H(+), Mn(+2), Fe(+2), Mg(+2), Ca(+2), Na(+), and K(+), and (2) solid, liquid, aqueous, and gaseous compounds or species formed from these ions. The tables contain the following: the thermochemical property values, enthalpy of formation, delta sub f H deg Gibbs energy of formation, delta sub f G deg, entropy, S deg, and heat capacity, C sub P deg all

at 298.15 K, as well as the enthalpy difference between 298.15 K and O K, H deg H sub 0 deg for the basic species are presented. The predicted values for delta H deg, delta G deg, and delta S deg as well as log K (equilibrium constant) for the processes, or reactions, are also presented. The property values, theta sub L, the relative apparent molar enthalpy, gamma(+) from the mean ionic activity coefficient, and theta, the osmotic coefficient, for binary aqueous systems at 298.15 K, all as a function of concentration are included. GRA

N83-12208# Rice Univ., Houston, Tex. GA730486
PHASE EQUILIBRIUM STUDIES FOR METHANE/SYNTHESIS GAS SEPARATION: THE HYDROGEN-CARBON MONOXIDE-METHANE SYSTEM
Jane Huey Hong and Riki Kobayashi Apr. 1982 34 p refs
(PB82-200637; GRI-79/0113; RR-55) Avail: NTIS HC A03/MF A01 CSCL 07D

Vapor liquid equilibria for hydrogen-carbon monoxide-methane ternary system and associated binaries were investigated. The composite data are of particular benefit to the supplemental gas industry, wherein the separation of product methane from recycle gas is of major importance. A reliable data base from which accurate equilibria prediction models may be developed is presented. GRA

N83-12209# National Bureau of Standards, Washington, D.C.
ENTRAINMENT AND HEAT FLUX OF BUOYANT DIFFUSION FLAMES Final Report
B. J. McCaffrey and G. Cox Feb. 1982 36 p refs
(PB82-196296; NBSIR-82-2473) Avail: NTIS HC A03/MF A01 CSCL 13L

Measurements of the vertical component of velocity in buoyant diffusion flames from extended sources by both cross-correlation and pressure probe techniques incorporating time-average signal processing appear to overestimate the transverse size of these systems based on a heat balance using measured mean flux. By utilizing measurement of the radiative fraction of the flames, and forcing a mean flux heat balance, estimates of the transverse variation of velocity are obtained and expressions for flame entrainment and convective heat flux are determined. The use of mean values is seen to lead to both overestimates as well as underestimates of total flux due to turbulent transport. GRA

N83-12210# Environmental Protection Agency, Washington, D.C. Office of Solid Waste.
TEST METHODS FOR EVALUATING SOLID WASTE: PHYSICAL/CHEMICAL METHODS
Feb. 1982 28 p
(PB82-172156; EPA/SW-846C) Avail: NTIS HC A03/MF A01 CSCL 07D

This method is based on the separation of Cr(VI) from solution by coprecipitation of lead chromate with lead sulfate in a solution of acetic acid. After separation the supernate (containing Cr(III) is drawn off, the precipitate washed to remove occluded Cr(III), then the Cr(VI) is reduced and resolubilized in nitric acid and quantified as Cr(III) by either flame or furnace atomic absorption spectrometry. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-12211# Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
EXPERIMENTAL STUDIES OF THE EFFECT OF SCALE ON THE STRESSING OF METALS [DOSWIADCZALNE BADANIA EFEKTU SKALI W ZMECZENIU]
Piotr Kumierski and Wilhelm Orsetti 1981 27 p refs In POLISH
(ISSN-0208-5658) Avail: Issuing Activity

Two types of experimental investigations of the influence of size on the stressing of metals are reviewed. The first, traditional type of study examines the effect of the size of an element on the value of stress limitation. Results from these studies show that the value of the limiting range of stress increases as the size of an element decreases. The intensity of the growth of the limiting range of stress associated with the size of an element indicates the tendency of the effect of scale to increase as element size decreases. The second type of study concerns the effect of size on the nature of the Wohler curve. The characteristic features found for stress curves are discussed. Transl. by J.D.

N83-12212 Stanford Univ., Calif.
EXPERIMENTAL INVESTIGATIONS OF MEAN STRESS EFFECT OF METAL FATIGUE USING DISCRIMINATING SPECIMENS Ph.D. Thesis
Varouj Ghahremani Baghdasrian 1982 179 p
Avail: Univ. Microfilms Order No. DA8220423

The effect of mean normal stress on long life fatigue was experimentally investigated using stainless steel type 304, pressure vessel steel type A533-B, and SAE 4340 steel heat treated to 44 Rockwell C hardness bending fatigue specimens. The first two materials are used in nuclear power plants, their yield strength is not much higher than their fully reversed fatigue strength. Small mean stress produced continual yielding during fatigue tests on the first two types of steels. The third material, SAE 4340 steel is used in aircraft and other weight sensitive applications. Fatigue tests on this material showed much more influence of the mean stress on sustainable alternating stress than predicted by the widely used formulas. A total of six discriminating type specimens were sufficient to determine the mean stress influence coefficient (m) for SAE 4340 steel. Dissert. Abstr.

N83-12213*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
FINITE ELEMENT MODELS FOR PREDICTING CRACK GROWTH CHARACTERISTICS IN COMPOSITE MATERIALS
M. B. Buczek and C. T. Herakovich Oct. 1982 141 p refs
(Contract NCC1-15)
(NASA-CR-169478; NAS 1.26:169478; VPI-E-82-29) Avail: NTIS HC A07/MF A01 CSCL 11F

Two dimensional and quasi-three dimensional, linear elastic finite element models for the prediction of crack growth characteristics, including crack growth direction, in laminated composite materials are presented. Mixed mode crack growth in isotropic materials, unidirectional and laminated composites is considered. The modified crack closure method is used to predict the applied load level for crack extension and two failure theories, modifications of the point stress and the Hashin failure criteria, are proposed to predict the direction of crack extension in composites. Comparisons are made with the Tsai-Wu failure criterion and the Sih strain energy density criterion as well as with experimental results. It is shown that the modified versions of point stress and Hashin criteria compare well with experiment. S.L.

N83-12214*# AiResearch Casting Co., Torrance, Calif.
CAST Fe-BASE CYLINDER/REGENERATOR HOUSING ALLOY Quarterly Technical Narrative Report, 25 Aug. - 30 Nov. 1980
F. Larson and L. Kindlimann 10 Dec. 1980 39 p refs
(Contract DEN3-234)
(NASA-CR-169474; NAS 1.26:169474; ACC-80-17602; QTNR-1) Avail: NTIS HC A03/MF A01 CSCL 11F

The development of an iron-base alloy that can meet the requirements of automotive Stirling engine cylinders and regenerator housings is described. Alloy requirements are as follows: a cast alloy, stress for 5000-hr rupture life of 200 MPa (29 ksi) at 775 C (1427 F), oxidation/corrosion resistance comparable to that of N-155, compatibility with hydrogen, and an alloy cost less than or equal to that of 19-9DL. The preliminary screening and evaluation of ten alloys are described. J.D.

N83-12215*# IIT Research Inst., Chicago, Ill.
DETERMINATION OF HYDROGEN PERMEABILITY IN UNCOATED AND COATED SUPERALLOYS Interim Report
S. Bhattacharyya, E. J. Vesely, Jr., and V. L. Hill Jan. 1981

65 p refs
(Contracts DEN3-6; DE-A101-77CS-51040)
(NASA-CR-165209; DOE/NASA-0006-1; NAS 1.26:165209; IITRI-M6004-36) Avail: NTIS HC A04/MF A01 CSCL 11F

Hydrogen permeability, diffusivity, and solubility data were obtained for eight wrought and cast high temperature alloys over the range 650 to 815 C. Data were obtained for both uncoated alloys and wrought alloys coated with four commercially available coatings. Activation energies for permeability, diffusivity and solubility were calculated. Author

N83-12216# Japan Light Metal Welding and Construction Association, Tokyo. Welding Procedure Committee.
APPLICATION OF ALUMINIUM ALLOYS TO LARGE WELDED STRUCTURES IN JAPAN
M. Mizuno (Kyoto Univ.) and H. Nagaoka (Ishikawajima-Harima Heavy Industries Co. Ltd.) [1982] 21 p refs
Avail: NTIS HC A02/MF A01

A review of aluminium alloys is presented. Welding processes, the mechanical properties of welds, and typical structures constructed in Japan which demonstrate applications of aluminium alloys are discussed. J.D.

N83-12217# Naval Weapons Center, China Lake, Calif. Engineering Dept.
HYDROGEN EMBRITTLEMENT IN 17-4PH STAINLESS STEEL Final Report, 1981 - 1982
Kenneth R. Hayes Aug. 1982 30 p refs
(AD-A118716; NWC-TP-6343) Avail: NTIS HC A03/MF A01 CSCL 11/6

Tensile and Charpy impact test specimens of 17-4PH stainless steel in Conditions. A, H900, H950, H1000, H1050, H1100, H1150 and H1150M were cathodically charged with hydrogen for various lengths of time. After charging, the specimens were mechanically tested at room temperature. The tensile tests were conducted at strain rates of 0.02, 0.2, 2.0, and 20 min-1. Changes in mechanical properties (reduction in area, ultimate strength, hardness) were correlated with heat treatment, hydrogen charging level, and strain rate. Scanning electron microscope (SEM) fractography was employed to characterize fracture surfaces and provide information concerning the failure modes that were operating. In the tensile investigation, hydrogen charging was shown to greatly reduce the percent reduction in area (% RA) of 17-4PH stainless steel in all heat treatment conditions. The decreases became more pronounced as the yield and ultimate strengths increased and with increased charging time. For a given charging treatment and aging condition the % RA was shown to be a function of strain rate, the largest decrease in % RA being measured at intermediate strain rates. GRA

N83-12218# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
A SINGLE SPECIMEN J-BASED FRACTURE TOUGHNESS TEST FOR HIGH STRENGTH STEELS Final Report
J. A. Kapp and J. H. Underwood May 1982 32 p refs Presented at the 14th Natl. Symp. on Fracture Mech., Los Angeles, 29 Jun. - 1 Jul. 1981
(DA Proj. 1L1-61101-A-91A)
(AD-A118674; AD-E440159; ARLCB-TR-82010) Avail: NTIS HC A03/MF A01 CSCL 20/11

A single specimen J-based fracture toughness test has been developed which results in accurate and reliable measurements for a high strength, low alloy steel with several yield strengths. The specimen used is a deeply cracked Charpy specimen tested in slow, three-point bending. A simple plastic stress analysis was performed which identifies a single point on the load-displacement trace at which the J-integral is calculated as an estimate of fracture toughness (Klc). The method can be applied inexpensively and may be used as a quality control measure of fracture toughness. GRA

N83-12219# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
IMPROVED ELECTRODEPOSITED LOW CONTRACTION CHROMIUM Final Report
E. S. Chen Apr. 1982 18 p refs Submitted for publication
(DA Proj. 1L1-61102-AH-60)
(AD-A118678; AD-E440156; ARLCB-TR-82009) Avail: NTIS HC A02/MF A01 CSCL 11/3

A systematic study was made to optimize the parameters for plating high quality LC chromium using standard chromic acid solutions and solutions containing vanadium additions. The results indicate that deposit strengths were improved substantially by aging the plating solution at 250 A hr/liter and by using current densities in excess of 120 A/sq dm. Under these conditions, hydrogen incorporation was reduced five-fold while hardness, strength, and cathode efficiency were maximized. A further improvement in deposit strength was obtained by adding vanadium as V2O5 at a concentration of 10 g/1 to standard chromic acid solutions. At higher concentrations, inferior deposits were produced that showed surface roughness, porosity, low strength, and higher hydrogen content. GRA

N83-12220# California Univ., Davis. Dept. of Mechanical Engineering.
FUNDAMENTAL INVESTIGATIONS OF SUPERPLASTIC FORMING PROCESSES Final Scientific Report, 1 Feb. 1979 - 31 Jan. 1982
Amiya K. Mukherjee and A. Arieli Mar. 1982 74 p refs Submitted for publication
(Grant AF-AFOSR-0069-79; AF Proj. 2306)
(AD-A118614; AFOSR-82-0677TR) Avail: NTIS HC A04/MF A01 CSCL 11/6

The elevated deformation behavior of Zn-22% Al alloy was investigated, with special emphasis on the micromechanisms of deformation. Constant strain rate data on flow stress vs strain rate at different temperature and with specimens with different grain sizes were analyzed. From this analysis the constitutive equations for superplastic creep, dislocation-climb creep, coble creep and Nabarro creep processes were established. Finally the results were depicted in the form of a three dimensional deformation mechanism map with normalized parameters of grain size, temperature and stress as the coordinates. Author (GRA)

N83-12221# California Univ., Los Angeles. Dept. of Materials Science and Engineering.
FUNDAMENTAL INVESTIGATION OF THE RETROGRESSION AND REAGING (RRA) OF COMMERCIAL Al-BASE ALLOYS ITS EFFECT ON STRESS CORROSION CRACKING Annual Progress Report, 1 Mar. 1981 - 28 Feb. 1982
A. J. Ardell and J. K. Park 26 May 1982 82 p refs
(Contract N00014-81-K-0292; NR Proj. 381-146)
(AD-A118553; APR-1) Avail: NTIS HC A05/MF A01 CSCL 11/6

The microstructure of 7075 Al, aged to the T6 and T76 temper conditions, has been carefully characterized with respect to the nature of the precipitate phases that exist in the matrix and in grain boundaries, and the parameters associated with their dispersions. The microstructural changes that occur during various retrogression and retrogression and reaging heat-treatments have been thoroughly documented. The possible consequences of these latter heat treatments on the stress-corrosion susceptibility and yield strength of Al 7075 are discussed. Author (GRA)

N83-12222# Sandia Labs., Albuquerque, N. Mex.
DIFFUSIONAL TRANSFORMATIONS, STRENGTHENING MECHANISMS, AND MECHANICAL PROPERTIES OF URANIUM ALLOYS
Kenneth H. Eckelmeyer May 1982 75 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020051; SAND-82-0524) Avail: NTIS HC A04/MF A01

The effects of diffusional phase transformations on the microstructures and mechanical behaviors of uranium alloys are described. Slow cooling results in diffusional decomposition of the (BETA)-phase and frequently produces undesirable properties.

Quenching suppresses diffusional decomposition of the (BETA)-phase and produces supersaturated solid solutions at room temperature. These supersaturated solutions can be age hardened to produce a wide range of strengths, ductilities, and toughnesses. Alternative strengthening mechanisms are also discussed and preliminary results are presented. It is suggested that outstanding mechanical properties may be obtained by deformation strengthening. DOE

N83-12223# Oak Ridge National Lab., Tenn. Solid State Div.
NEAR SURFACE MODIFICATION: NEW TECHNIQUES AND APPLICATIONS IN MATERIALS SCIENCE
B. R. Appleton, C. C. Koch, J. H. DeVan, K. Farrell, M. B. Lewis, S. Raman, P. F. Tortorelli, and J. M. Williams Aug. 1982 131 p refs
(Contract W-7405-eng-26)
(DE82-020704; ORNL-5896) Avail: NTIS HC A07/MF A01

Several materials processing techniques or applications of some existing techniques which have lead to materials modifications are reviewed. The extent to which the near surface regions of materials can be modified utilizing the various techniques is discussed. The near surface modification techniques are described. The more established techniques considered are physical and chemical vapor deposition and liquid quenching. Ion implantation doping, pulsed laser annealing and ion beam and pulsed laser mixing are emphasized. Four areas were singled out for consideration and the usefulness of these near surface modification techniques in these areas are assessed. DOE

N83-12224# California Univ., Los Angeles.
EFFECT OF MOLYBDENUM PLUS CHROMIUM ON THE CORROSION OF IRON-, NICKEL-, AND COBALT-BASE ALLOYS IN BASALTIC LAVA AND SIMULATED MAGMATIC GAS AT 11500C
S. A. Ehrlich and D. L. Douglass Jun. 1982 79 p refs
(Contract DE-AC04-76DP-00789)
(DE82-021127; SAND-82-7055) Avail: NTIS HC A05/MF A01

The compatibility of several binary and ternary alloys in a magma environment was studied. Binary alloys containing molybdenum and ternary alloys containing chromium and molybdenum were exposed to basaltic lava at 11500 C for periods of 24 and 96 hours. A cover gas was used to produce oxygen and sulfur fugacities corresponding to those of the gases dissolved in basaltic melts. Three base metals were used. These included iron, nickel, and cobalt. The primary reactions in binary alloys were found to be sulfidation. Oxide scales with a spinel layer formed on ternary alloys. The synergistic effect of molybdenum and chromium additions in ternary alloys exhibited superior corrosion resistance to binary alloys which formed base metal sulfides down grain boundaries. Extensive analyses of the reaction products were analyzed by scanning electron microscopy, X-ray energy dispersive analysis, electron microprobe analysis, and metallography. The products formed are discussed with reference to thermodynamic stability diagrams, and the reaction path concept is used to explain some of the corrosion. DOE

N83-12225# Bettis Atomic Power Lab., Pittsburgh, Pa.
METALLOGRAPHIC STANDARDS FOR ESTIMATING HYDROGEN CONTENT OF ZIRCALOY-4 TUBING (LWBR DEVELOPMENT PROGRAM)
B. Z. Hyatt Feb. 1982 52 p refs
(Contract DE-AC11-76DP-00014)
(PB82-022074; WAPD-TM-1431) Avail: NTIS HC A04/MF A01 CSCL 11F

Metallographic standards (with 10 to 11,600 ppM H2) for estimating hydrogen content of light water breeder reactor Zircaloy-4 tubing were prepared by corrosion of Zircaloy-4 tubing specimens in LiOH solutions at 6000 F and 6800 F. Microstructures and measured hydrogen contents of several standards agreed well with microstructures and measured hydrogen of an irradiated corroded Zircaloy-4 tubing specimen and an unirradiated hydrided Zircaloy-4 sheet specimen. Vickers hardness data and corrosion weight gain data also are presented. GRA

N83-12226# Ames Lab., Iowa.
SHAPE-MEMORY RESISTIVITY BEHAVIOR OF TRANSFORMATION-FATIGUE-CYCLED NICKEL-TITANIUM WIRES NEAR THE EQUIATOMIC COMPOSITION
C. H. Hsu and M. S. Wechsler Feb. 1982 37 p refs
(Contract W-7405-eng-82)
(DE82-018272; IS-4792) Avail: NTIS HC A03/MF A01

The resistivity transformation behavior was investigated as a function of applied tensile stress for equiatomic Ni-Ti wires in the uncycled condition and after millions of stress-temperature cycles (transformation fatigue cycling) in several shape memory heat engine devices. The shape of the resistivity anomaly peak on cooling changes as the stress is increased due to progressive increases in the martensite start temperature and resistivity. As a result of prior transformation fatigue cycling, the stress dependence of the martensite resistivity is reduced, the anomaly peak is broadened, and transformation induced changes in resistivity and length on cooling and heating take place in two stages instead of one. One hour anneals at 4000 C and 6000 C induce different characteristic shapes to the anomaly peak and cause the two stage behavior for the cycled wire to be eliminated. The results are interpreted in terms of the formation of a rhomobohedral phase (R phase) with attendant increases in resistivity. DOE

N83-12227# Indian Inst. of Tech., Bombay. Dept. of Metallurgical Engineering.
POWDER METALLURGY ALLOYS: PROCEEDINGS OF THE SYMPOSIUM
P. Ramakrishnan, ed. New Delhi Oxford and IBH Publishing Co. 1982 120 p refs Proc. held at Bombay, 11 Oct. 1980
(PB82-253931) Copyright. Avail: Issuing Activity CSCL 11F

Powder metallurgy alloy technology was reviewed. For individual titles, see N83-12228 through N83-12234.

N83-12228# Indian Inst. of Science, Bangalore. Dept. of Metallurgy.
POWDER METALLURGY OF SUPERALLOYS
R. V. Tamhankar *In* Indian Inst. of Tech. Powder Met. Alloys 1982 p 1-21 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

The state of the art of powder metallurgy in the production of superalloys is surveyed. Various powder metallurgy steps are described in detail with reference to production of alloys for gas turbine engines. Processes for powder production, particularly argon atomization and vacuum atomization, are described. Mechanical alloying and powder handling to reduce contamination are discussed. Powder compaction using hot isostatic pressing, isothermal hot forging, and thermoplastic processing, are described. J.D.

N83-12229# National Aeronautical Lab., Bangalore (India). Materials Science Div.
PRODUCTION OF TITANIUM ALLOY POWDERS
R. Seshadri, R. Sundaresan, and A. C. Raghuram *In* Indian Inst. of Tech. Powder Met. Alloys 1982 p 22-36 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

Centrifugal atomization processes used for the production of titanium alloys for advanced aircraft gas turbines are evaluated. The limited number of processes that have been developed include the rotating electrode process (REP) developed in USA, the centrifugal shot casting process (CSC) developed in UK, the electron beam rotating disc (EBRD) process developed in West Germany, the vacuum atomization process (PSV) developed in France and the rotating rod process (RRP) developed at NAL in India. The rotating rod process developed in India is examined in detail. Analysis of experience with the atomization of the alloy Ti-6A1-4V is presented with details on the optimization of parameters for the best yield of useful powder. The characteristics of the powder are discussed. The future program on the consolidation of these powders to final shapes is also indicated. J.D.

N83-12230# Indian Inst. of Tech., Bombay. Dept. of Metallurgical Engineering.

SOME STUDIES ON THE ALUMINIUM ALLOY FORMATION DURING SINTERING OF METAL POWDERS

E. Ramasamy and P. Ramakrishnan *In its* Powder Met. Alloys 1982 p 47-57 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

The sintering of aluminum, aluminum-copper, and aluminum-copper-magnesium blended powder compacts of different porosities in nitrogen atmosphere with a dew point of 45 C. The dimensional changes during heating of the compact at the rate of 22 C per minute up to 600 C as well as isothermal sintering at 600 C were recorded with the help of a dilatometer. An attempt was made to study alloy formation in the binary and ternary systems during sintering with the help of microstructural and microhardness studies. Based on these results the effect of alloying powder additions on the formation of liquid phase and subsequent alloying are discussed briefly. Author

N83-12231# Indian Inst. of Tech., Kharagpur. Materials Science Centre.

EFFECT OF HERF ON SINTERING KINETICS OF FERROGRAPHITE COMPOSITES

S. Basu, T. K. Garkavaya (Powder Metallurgy Inst., Minsk, USSR), and O. V. Roman (Powder Metallurgy Inst., Minsk, USSR) *In its* Powder Met. Alloys 1982 p 58-70 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

Samples of iron powder with 1% graphite were pressed at two compacting speeds of 30 mm/min and 300 meters/sec to identical green densities. A simple dilatometric set up was prepared to study the shrinkage of the briquettes both athermally and isothermally at various temperatures under argon atmosphere. Sintering of iron graphite composites compacted at high speed leads to activation of the process. Graphite plays an important role particularly in the alpha phase sintering. The analysis of the kinetics of the process threw important light on the mechanism of the reaction. Author

N83-12232# Bhabha Atomic Research Centre, Bombay (India). Metallurgy Div.

PREPARATION OF ZIRCONIUM-NICKEL ALLOY BY POWDER METALLURGY

T. S. Krishnan and P. R. Menon *In* Indian Inst. of Tech. Powder Met. Alloys 1982 p 71-76 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

A process for the preparation of high purity zirconium-nickel alloy by powder metallurgy is described. Zirconium and nickel powders (-325 mesh) are intimately mixed and compacted into cylindrical pellets (1 cm dia x 1 cm high) at 25 to 40 tsi pressure. The pellets are then sintered in vacuum in the temperature range of 900 to 1100 C for durations of 2 to 4 hours to form the alloy. The zirconium-nickel alloy thus obtained is then hydrided at 700 C at a hydrogen pressure of about 1 kg/cu cm and the resulting hydride crushed and ball milled to powder in acetone. After drying, the hydride powder is subjected to pyrovacuum treatment at 900 C (vacuum better than 1 micron) for the removal of hydrogen. The dehydrided powder is then cooled to room temperature and conditioned in a progressive mixture of argon and air, and finally in air prior to exposure to outside atmosphere. The zirconium-nickel alloy powder as prepared above has a residual hydrogen content of less than 200 ppm and is acceptable for the manufacture of gasless delay pyrotechnic compositions. Author

N83-12233# Indian Inst. of Tech., Kanpur. Dept. of Metallurgical Engineering.

CARBIDE-BINDER PHASES IN CEMENTED CARBIDES

G. S. Upadhyaya *In its* Powder Met. Alloys 1982 p 77-89 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

An attempt to systematise the selection of various refractory carbides and transition metal binders in development of cemented carbides is presented. The historical sequence of such development is highlighted, followed by the scientific basis for the selection of such phases. An attempt is made to rationalize the calculation of cemented carbides for their efficient utilization. Author

N83-12234# Bhabha Atomic Research Centre, Bombay (India). Metallurgy Div.

THE POWDER METALLURGY OF RARE EARTH-COBALT PERMANENT MAGNETS

C. V. Sundaram and T. S. Krishnan *In* Indian Inst. of Tech. Powder Met. Alloys 1982 p 90-104 refs (For primary document see N83-12227 03-26)
Avail: Issuing Activity CSCL 11F

Powder metallurgy techniques for production of the rare earth cobalt alloys in the raw form and as fabricated permanent magnets are described. In the rare earth (RE)-cobalt system, the most attractive phase from the point of view of permanent magnet properties is the RE-Co phase, and thus, it is necessary to ensure close control on composition, and the absence of undersirable phases. Particle size and impurities are two other important parameters that affect their magnetic characteristics. The large difference in the melting points of some of the rare earth metals and cobalt, the total lack of solid solubility, and the high sensitivity of the rare earth metals to atmospheric contamination necessitate repeated meltings, followed by high temperature annealing of the alloys overlong periods in an oxygen free environment, to produce homogeneous alloys. Milling of the cast alloy, production of the right particle size powder and fabrication of the magnets have all to be done with extreme care with critical control at each stage, thus adding to the complexities of the processing problems. Author

N83-12235# Vacuumschmelze G.m.b.H., Hanau (West Germany).

DEVELOPMENT OF SOFT MAGNETIC ALLOYS WITH SPECIAL PROPERTIES

Albrecht Mager Oct. 1979 137 p refs
(PB82-207358; BMFT-FB-T-79-32) Avail: NTIS HC A07/MF A01 CSCL 11F

Soft magnetic alloys are developed based on an understanding of the magnetizing processes in close connection with the development of magnetic forms and components for different applications. The influence of crystal grains, inclusions, and mechanical stresses on the soft magnetic properties of Ni-Fe-alloys with ca. 50 to 75% Nickel-contents are studied. Special soft magnetic alloys were developed and improved for low temperature applications, for small temperature coefficients, for different shapes of hysteresis loops, or for high wear resistance and forms, components, and basic designs of chokes for RFI suppression, of transforms for ground fault interrupters, and for magnetic shielding equipments. GRA

N83-12154*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

CONSERVATION OF STRATEGIC METALS

Joseph R. Stephens *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 141-164 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

N83-12155*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

SOLIDIFICATION PROCESS CONTROL FOR ADVANCED SUPERALLOYS

Hugh R. Gray and Robert L. Dreshfield *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 165-182 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

N83-12156*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ADVANCED POWDER METALLURGY ALUMINUM ALLOYS AND COMPOSITES

W. B. Lisagor and B. A. Stein *In its* Advan. Mater. Technol. Nov. 1982 p 183-200 refs (For primary document see N83-12147

03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

N83-12157*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCES IN METALS PROCESSING
Thomas T. Bales and Dick M. Royster *In its* Advan. Mater. Technol. Nov. 1982 p 201-218 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

N83-12158*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FATIGUE AND FRACTURE RESEARCH IN METALS
J. C. Newman, Jr. and J. R. Davidson *In its* Advan. Mater. Technol. Nov. 1982 p 219-232 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

N83-12159*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HIGH-TEMPERATURE FATIGUE IN METALS
Gary R. Halford *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 233-260 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11F

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-12236# Polish Academy of Sciences, Warsaw. Zaklad Ukladow Mechaniczynych.
ANALYSIS OF THE PROPERTIES OF VIBROISOLATING MATERIAL DESCRIBED USING THE REOLOGICAL MODEL [ANALIZA WLASCIWOSCI MATERIALU WIBROIZOLACYJNEGO OPISANEGO MODELEM REOLOGICZNYM]
Jerzy Wicher 1981 39 p refs In POLISH
(ISSN-0208-5658) Avail: Issuing Activity

The properties of the polymer rubber, a frequently used vibroisolating material, are described based on the rheological model. This model is a combination of fundamental models representing attenuation and elasticity. The behavior of polymers under the influence of dynamic external loads is described according to Burger's rheological model, with the value of the model's parameters designated on the basis of information obtained by measuring characteristics of the mechanical structure. The nominal values determined in this way can be used to design the rubber elements utilized in vibroisolating structures. Author

N83-12237*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
APPLICATION OF THERMOCHEMICAL MODELING TO AIRCRAFT INTERIOR POLYMERIC MATERIALS Final Report, 30 May 1980 - 30 May 1981
Won Dokko and Kumar Ramohalli Atlantic City, N.J. FAA Jun. 1982 74 p refs Sponsored by NASA
(Contract DOT-FA80NA)
(NASA-CR-169384; JPL-5030-543; NAS 1.26:169384; FAA-CT-82-83) Avail: NTIS HC A04/MF A01

This report summarizes the results from a twelve-month study of the feasibility of applying certain basic concepts in thermochemical modeling to aircraft cabin fire safety. The concepts developed earlier on a NASA-sponsored program were applied to six specific tasks dealing with the thermochemical performance of interior carpets and seat cushions. The specific objective was to predict the burning rate as a function of the material property values, geometry and heat flux; more important, it was the aim to predict and provide rationale for certain special features that have been experimentally observed by the FAA. It was also the specific objective to introduce new concepts that have not been the subject of pursuit at other centers. That is, the novel concepts developed at JPL were highlighted. Three fundamental hypotheses were introduced: the condensed phase degradation of the polymeric material is the overall rate-limiting step; the extent of degradation at the vaporization step (at the surface) is not arbitrary but has to be specified by a scientific criterion such as the vapor pressure equilibrium criterion; and the diffusion/mixing of the pyrolysis products with the oxidizer (air) is the rate-limiting step in the vapor phase combustion. B.W.

N83-12238# National Academy of Sciences - National Research Council, Washington, D. C. Ad Hoc Committee on Polymer Science and Engineering.
POLYMER SCIENCE AND ENGINEERING: CHALLENGES, NEEDS AND OPPORTUNITIES
1981 229 p refs
(Grant NSF CHR-79-009931)
Avail: NTIS HC A11/MF A01

Needs and opportunities in basic research pertaining to polymer science and engineering are assessed. Progress is reviewed as a background for assessing needs. Promising areas of polymer research are highlighted. Problems in securing the depth and variety of research and educational support needed to maintain leadership in this interdisciplinary field are discussed. A state of the art review of the field and of outstanding unsolved problems is presented. Four major areas are reviewed: polymer chemistry and synthesis; physics and physical properties; processing and engineering properties; and polymers of biological and medical importance. The economic importance of polymers and the relevance of basic polymer research to meeting various categories of national needs are described. Polymer research support, involving the long range interests of the universities, industry, and the public represented by the federal government is addressed. The related problem of securing a sounder base for education in polymer science and engineering, adequate to fulfill the perceived need, and of relating this interdisciplinary field more productively to the disciplines traditionally represented in the academic curriculum is also described. S.L.

N83-12239*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
METAL PHTHALOCYANINE POLYMERS Patent Application
Bappalige N. Achar (NAS-NRC, Washington, D.C.), George M. Fohlen, and John A. Parker, inventors (to NASA) Filed 8 Sep. 1982 21 p
(NASA-Case-ARC-11405-1; US-Patent-Appl-SN-415880) Avail: NTIS HC A02/MF A01 CSCL 11I

Metal 4, 4', 4', 4''-tetracarboxylic phthalocyanines (MPTC) are prepared by reaction of trimellitic anhydride, a salt or hydroxide of the desired metal (or the metal in powdered form), urea and a catalyst. A purer form of MPTC is prepared than heretofore. These tegracarboxylic acids are then polymerized by heat to sheet polymers which have superior heat and oxidation resistance. The metal is preferably a divalent metal having an atomic radius close to 1.35A. NASA

N83-12240# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
FRACTURE ANALYSIS OF PVC PIPE MATERIALS
A. Y. Darwish, J. F. Mandell, and F. J. McGarry Oct. 1981 169 p refs Sponsored in part by Agency for International Development (R81-7) Avail: NTIS HC A08/MF A01

The fracture behavior of rigid PVC (polyvinyl chloride) pipe materials was studied. The fracture toughness and the applicability of linear elastic fracture mechanics (LEFM) were studied over a range of temperature and rate, and for various specimen geometries. Specimens were taken from commercial water distribution pipes either as received or flattened near the softening temperature to create a sheet. Tests were run over several decades of rate in a servohydraulic testing machine, while recording the force and displacement in most cases. Initial cracks were razor sharpened. The fracture behavior of PVC is shown to shift from notch

insensitive, yield stress controlled, to brittle, LEFM controlled as the temperature decreases or the rate increases. A rate temperature relationship to represent the transition behavior is given. Fracture toughness associated with the initiation of unstable crack growth was found to be higher than the static arrest toughness value by about 3 to 4 times. S.L.

N83-12241# Southwest Research Inst., San Antonio, Tex. Fuels and Lubricants Research Lab.
CHARACTERIZATION AND EVALUATION OF RE-REFINED ENGINE LUBRICATING OIL Interim Report, Oct. 1979 - Sep. 1981
Edwin A. Frame and Karen B. Kohl Dec. 1981 90 p refs
(Contracts DAAK70-80-C-0001; DAAK70-82-C-0001; DA Proj. 1L7-62733-AH-20)
(AD-A118573; AFLRL-152; SWRI-6800-299) Avail: NTIS HC A05/MF A01 CSCL 11/8

This program was conducted to obtain additional data base on the comparative performance of re-refined and virgin oils and to investigate the potential 'substantial equivalence' of re-refined and virgin lubricating oils. The program consisted of: (1) the development of an engine deposit removal, recovery, and analysis methodology. This methodology was used to compare engine deposits derived from virgin and re-refined engine oils, (2) the effects of virgin and re-refined oils on engine blowby composition and engine deposit generation were determined using a spark ignition engine and, (3) virgin and re-refined basestock production consistency were determined by participating in the ASTM/NBS cooperative basestock consistency study. Author (GRA)

N83-12242# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Materials Engineering.
CHEMICAL DURABILITY IMPROVEMENT AND STATIC FATIGUE OF GLASSES Final Technical Report, 1 Apr. 1978 - 31 Mar. 1982
Minoru Tomozawa Aug. 1982 21 p
(Contract N00014-78-C-0315)
(AD-A118837) Avail: NTIS HC A02/MF A01 CSCL 11/2

The following research results were obtained: (1) The rate of corrosion of silica glass by hot alkaline solution was reduced when a small amount of calcium is added to the solution. This inhibitor effect was caused by the deposition of calcium on the glass surface and a protective film formation. Similar but less drastic effect was observed for other alkaline earth elements. When heavy alkaline earth elements such as strontium, barium are contained in the alkaline solution, severe, mechanically damaging surface flow developed; (2) Mechanical strength of high silica glass was measured in various solvents. The strength varied while the dynamic fatigue susceptibility did not; (3) Surface of silica glass was made hydrophobic by chemical reactions. The resulting glasses showed very little tendency of dynamic fatigue; (4) Dissolution rate of silica glass was found to increase under hydrostratic pressure; (5) The strength increase commonly observed for abraded glass immersed in water (crack blunting) was attributed to dissolution-precipitation mechanism rather than to simple dissolution; and (6) Dynamic fatigue susceptibility of sodium silicate glasses was found to increase with increasing water content in glass. GRA

N83-12243# Bendix Corp., Kansas City, Mo.
STRESS RELAXATION OF CELLULAR SILICONE MATERIAL: 1982
J. W. Schneider Jun. 1982 19 p refs
(Contract DE-AC04-76DP-00613)
(DE82-020115; BDX-613-2784) Avail: NTIS HC A02/MF A01

The long term stress relaxation properties of cellular silicone materials at room temperature were evaluated. Both equilibrium and condensation type base polymers are included. Each material was compounded to yield densities of 0.34 and 0.52 g/cm(3) for thicknesses of 1.17, 1.52, and 2.54 mm. These density thickness combinations were compressed to nominal compressions of 20 and 40% with nine replicates at each condition. A specially designed fixture is used to maintain a specific compression on the cellular sample and a universal test machine is used to acquire the load data. The predicted load retention is between 58 and 67% of the original load. DOE

N83-12244# National Bureau of Standards, Washington, D.C. National Engineering Lab.
PAINT SOLUBILITY TESTING
John I. Thornton, Shmuel Kraus, Bruce Lerner, and Beth Hendrickson Jan. 1982 24 p Prepared in cooperation with California Univ. Sponsored in part by the National Inst. of Justice
(PB82-177049; NBS-SP-480-40) Avail: NTIS HC A02/MF A01 CSCL 11C

This report presents the results of a study to develop criteria for the characterization of paint through solubility testing. Experiments were conducted with common solvents to classify chemical reactivity with automobile and household paints. Seven categories of reactivity are defined, which form the basis for specifying the extent of solubility of paints in various reagents under controlled conditions of time and temperature. The report also describes a novel solubility test procedure by which acrylic lacquers, organic-dispersed enamels, and water-based enamels can be distinguished through sequential testing, a characterization not previously accomplished with solubility testing. Author (GRA)

N83-12149*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
POLYMER RESEARCH AT NASA LANGLEY RESEARCH CENTER
Terry L. St.Clair and Norman J. Johnston *In its* Advan. Mater. Technol. Nov. 1982 p 29-48 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

N83-12150*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
POLYMER MATERIALS RESEARCH AT NASA AMES RESEARCH CENTER
J. A. Parker, A. H. Heimbuch, and W. J. Gilwee *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 49-64 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

N83-12151*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POLYMER MATRIX COMPOSITES RESEARCH AT NASA LEWIS RESEARCH CENTER
T. T. Serafini *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 65-90 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11I

N83-12160*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FIBROUS CERAMIC INSULATION
Howard E. Goldstein *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 261-274 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 11C

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-12245# Materials Research Labs., Melbourne (Australia).
THE USE OF RECRYSTALLISED RDX IN CAST RDX/TNT COMPOSITIONS
William S. Wilson Mar. 1981 42 p refs
(MRL-R-805; AR-002-402) Avail: NTIS HC A03/MF A01

The particle size of RDX recrystallized from cyclohexanone

(Grade A Class 1) is much larger than that of milled and boiled RDX (Grade B Class 1), and as a larger sedimentation during castng of RDX/TNT/beeswax compositions. However this sedimentation occurs largely from the top of the casting, which is normally discarded, and the density and RDX distributions of pressure castings produced in the MRL experimental molds using either recrystallized or milled and boiled RDX appear to be satisfactory. The RDX/TNT/beeswax compositions derived from recrystallized RDX are less sensitive to shock initiation than are those derived from milled and boiled RDX, but there are indications that they may be more sensitive to impact. Author

N83-12246*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ANTIMISTING KEROSENE ATOMIZATION AND FLAMMABILITY
R. Fleeter, R. A. Petersen, R. D. Toaz, A. Jakub, and V. Sarohia Jul. 1982 182 p refs
(Contract FA-03-80-A-00215)
(NASA-CR-169385; JPL-Pub-82-40; NAS1.26:169385; DOT/FAA-CT-82-19) Avail: NTIS HC A09/MF A01

Various parameters found to affect the flammability of antimisting kerosene (Jet A + polymer additive) are investigated. Digital image processing was integrated into a technique for measurement of fuel spray characteristics. This technique was developed to avoid many of the error sources inherent to other spray assessment techniques and was applied to the study of engine fuel nozzle atomization performance with Jet A and antimisting fuel. Aircraft accident fuel spill and ignition dynamics were modeled in a steady state simulator allowing flammability to be measured as a function of airspeed, fuel flow rate, fuel jet Reynolds number and polymer concentration. The digital imaging technique was employed to measure spray characteristics in this simulation and these results were related to flammability test results. Scaling relationships were investigated through correlation of experimental results with characteristic dimensions spanning more than two orders of magnitude. S.L.

N83-12247# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
ANTIMISTING FUEL DEGRADER INVESTIGATION Final Report, Aug. 1981 - Jan. 1982
George A. Coffinberry Jun. 1982 65 p refs
(Contract DOT-FA79NA-6043)
(FAA-CT-82-72) Avail: NTIS HC A04/MF A01

An investigation was made of the General Electric F101 augmentor fuel pump to perform as a degrader of AMK fuel. The test plan specified the pumb be run at three power conditions in four separate tests. Test 1 was run utilizing Jet-A fuel to calibrate system parameters and set fuel flow rates at idle (1200 pounds per hour), cruise (5500 pph) and takeoff (16000 pph). Test 2 utilized AMK fuel at the same fuel flow rates as were used for Jet-A fuel, the pump being in its standard configuration. Tests 3 and 4 utilized AMK fuel at the same conditions, however, the pump was successively modified to enhance AMK degradation. Fuel samples were taken at the pump inlet and discharge. Pump inlet and discharge pressures and temperatures were monitored. Special sampling procedures were utilized to prevent the inadvertent degradation of the AMK fuel during the sampling process. Very high degradation levels of the AMK fuel was achieved at the cruise power condition for all three pump configurations. Somewhat reduced degradation levels were achieved at the idle and takeoff modes depending upon which pump configuration was being tested. Further testing was conducted to try to enhance degradation at the idle mode in the standard pump configuration. These results showed very high levels of degradation when he pump speed was increased by 12 percent. Author

N83-12248*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FRICTIONAL CHARACTERISTICS AND HEAT TRANSFER OF ANTIMISTING FUELS IN TUBES Final Report, Aug. 1980 - Sep. 1981
Joe Wat and V. Sarohia Aug. 1982 70 p refs
(Contracts NAS7-100; DTFA03-80-A-00215)
(NASA-CR-169388; JPL-PUBL-82-53; NAS 1.26:169388; FAA-CT-82-20) Avail: NTIS HC A04/MF A01

The modification in flow and heat transfer behavior caused by the presence of the antimisting polymer additive FM-9 in jet fuel was determined. The antimisting kerosene (AMK) skin friction versus Reynolds number, or Nusselt number versus Reynolds number behavior, can be divided into three regions: (1) Newtonian laminar region, (2) shear-thickening transition region, and (3) drag reduction turbulent region. At low flow rates, AMK has Newtonian behavior, i.e. constant viscosity. At a certain critical wall shear rate which depends on the fuel temperature and additive concentration, shear thickening occurs and causes a large increase in skin friction and heat transfer rates. In the third region, the skin friction and heat transfer rates drop rapidly and fall below the predicted Newtonian flow skin friction and heat transfer values; e.g., for 0.3 percent FM-9 AMK at a temperature of 20 C, these values coincide with Newtonian values at solvent Reynolds number, equal to 2.2 x 10 to the 4th power and 1.0 x to the 4th power. Beyond these points, there is a reduction in skin friction and heat transfer rates. Author

N83-12249# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMBUSTION INSTABILITY IN SOLID PROPELLANTS [ESTUDO DE INSTABILIDADE DE COMBUSTAO EM PROPELENTES SOLIDOS]
C. E. Rolfsen Salles Aug. 1982 7 p refs In PORTUGUESE; ENGLISH summary
(INPE-2507-PRE/187) Avail: NTIS HC A02/MF A01

Solid propellants combustion instability was studied by acoustic admittance measurements. A T - Burner device was used, where the oscillation growth and decay constants are measured. The mean flux properties are obtained from the Helmholtz free energy minimization method by Lagrange multipliers, with which the real part of the acoustic admittance is obtained. With these measurements, solid propellants are compared. Author

N83-12250*# Pennsylvania State Univ., University Park. Center for Air Environment Studies.
PERFORMANCE AND EMISSIONS CHARACTERISTICS OF AQUEOUS ALCOHOL FUMES IN A DI DIESEL ENGINE Final Report
J. Barry Heisey and Samuel S. Lestz Aug. 1981 141 p refs
(Contract DE-AI01-81CS-50006; Grant NAG3-91)
(NASA-CR-167917; DOE/NASA/0091-2; NAS 1.26:167917; CAES-590-81) Avail: NTIS HC A07/MF A01 CSCL 21D

A single cylinder DI Diesel engine was fumigated with ethanol and methanol in amounts up to 55% of the total fuel energy. The effects of aqueous alcohol fumigation on engine thermal efficiency, combustion intensity and gaseous exhaust emissions were determined. Assessment of changes in the biological activity of raw particulate and its soluble organic fraction were also made using the Salmonella typhimurium test. Alcohol fumigation improved thermal efficiency slightly at moderate and heavy loads, but increased ignition delay at all operating conditions. Carbon monoxide and unburned hydrocarbon emission generally increased with alcohol fumigation and showed no dependence on alcohol type or quality. Oxide of nitrogen emission showed a strong dependence on alcohol quality; relative emission levels decreased with increasing water content of the fumigant. Particulate mass loading rates were lower for ethanol fueled conditions. However, the biological activity of both the raw particulate and its soluble organic fraction was enhanced by ethanol fumigation at most operating conditions. S.L.

N83-12251# SRI International Corp., Menlo Park, Calif.
DEFLAGRATION-TO-DETONATION IN HMX-BASED PROPELLANTS Final Report, 1 Jan. 1977 - 1 Nov. 1981
M. Cowperthwaite and W. J. Murri Mar. 1982 73 p refs
(Contract F49620-77-C-0039; AF Proj. 2308)
(AD-A118616; AFOSR-82-0673TR) Avail: NTIS

HC A04/MF A01 CSCL 19/1

The objective of the research was to develop the capability of assessing the deflagration-to-detonation transistion (DDT) hazard in HMX-based propellants. Theoretical and experimental studies were undertaken to elucidate mechanisms of DDT, to establish conditions for its occurrence, and to formulate a satisfactory model for its quantitative description. The theoretical studies were concerned with the thermo-hydrodynamic treatment of DDT. Equations governing flames treated as reactive discontinuities were derived, and conditions were established for shock formation in front of an accelerating flame. Model solutions to the one dimensional equations governing an accelerating flame in a closed table were constructed and examined to gain an insight into DDT. In the experimental study, an assembly was designed to allow incorporation of stress gages into propellant charges during the casting process, thereby eliminating the expensive machining and grooving operations conventionally used in constructing targets for Lagrange gage experiments. DDT experiments were performed in steel and Lexan confinement with propellant supplied by Edwards Air Force Base. However, internal pressure histories were recorded for the first time in a DDT experiment in the compressed propellant confined by steel. The gages recorded time periods of 300-500 microns, and peak pressure in the 2.5 to 4 kbar region. The limited pressure buildup is attributed to the small percentage of HMX in the propellant. GRA

N83-12252# Battelle Columbus Labs., Ohio.
ANALYTICAL TECHNIQUES FOR AROMATIC COMPONENTS IN AIRCRAFT FUELS Final Technical Report, 15 Jun. 1978 - 30 Sep. 1981
J. S. Warner, T. H. Danison, and J. S. McNulty Wright-Patterson AFB, Ohio AFWAL May 1982 155 p refs
(Contract F33615-78-C-2019; AF Proj. 3048)
(AD-A118838; AFWAL-TR-82-2015) Avail: NTIS HC A08/MF A01 CSCL 21/4

An ultraviolet detector was shown to be highly satisfactory for the selective determination of aromatic components in jet fuels. The detector was operated at 208 nm and used with a fused silica capillary column gas chromatographic system. The detector gave a linear response in the range of interest and could detect individual benzenes and naphthalenes in jet fuels at levels down to 0.01% and 0.002% respectively. Nitrogen-containing compounds were determined by the use of an alkali flame detector, high pressure liquid chromatography, and mass spectrometry.
Author (GRA)

N83-12253# Argonne National Lab., Ill. Materials Science Div.
MATERIALS TECHNOLOGY FOR COAL-CONVERSION PROCESSES Progress Report, Apr. - Jun. 1981
William A. Ellingson Sep. 1981 49 p refs
(Contract W-31-109-eng-38)
(DE82-004036; ANL/FE-81-53) Avail: NTIS HC A03/MF A01

Coal-slag/refractory interactions, ultrasonic erosion monitoring of metals, fluid acoustics, high temperature gaseous corrosion of metal alloys, and failure analysis were studied. Work on coal-slap/refractory interaction included the design of a gas fired rotating drum dynamic slag corrosion test furnace. Field tests on the high pressure loop (1 1/4 in. 321 SS piping) at the solvent refined coal liquefaction pilot plant were terminated because of excessive erosive wear (1.27 mm lost). Longitudinal and shear wave velocity measurements from room temperature to 5400 C were obtained on Types 304, 304L, 316, 347, and 410 stainless steels, Fe-2 1/4 Cr-1 Mo steel, Stellite 6B, Haynes metal, cold rolled steel, and cast stainless steel. Work on the fluid acoustic test loop included changing all seals at the flange joints and calibrating the volumetric flowmeter by using an ASME orifice plate installed in the test section. Agreement within 10% was achieved. The loop was cycled several dozen times over a wide range of flow rates. DOE

N83-12254# Argonne National Lab., Ill. Components Technology Div.
STATE-OF-THE-ART OF ACOUSTIC INSTRUMENTATION FOR COAL-CONVERSION PLANTS
A. C. Raptis and T. K. Lau (DOE) Oct. 1981 129 p refs
(Contract W-31-109-eng-38)
(DE82-004037; ANL/FE-49628-TM04) Avail: NTIS HC A07/MF A01

The state-of-the-art in development of acoustic instruments for coal conversion plants is presented. The feasibility for flow and temperature measurement parameters of the Sonar Equation and environmental conditions like: (1) attenuation of sound in coal conversion media; (2) the noise background levels in coal conversion plants; and (3) acoustic transducer and other material characteristics need to meet the requirements of the hostile environment. The current state of development of the high temperature acoustic Doppler flowmeter, active acoustic cross correlation flowmeter, and the acoustic flow/noflow indicator is emphasized. DOE

N83-12255# Mueller Associates, Inc., Baltimore, Md.
STATUS OF ALCOHOL-FUELS-UTILIZATION TECHNOLOGY FOR HIGHWAY TRANSPORTATION: A 1981 PERSPECTIVE. VOLUME 1. SPARK-IGNITION ENGINES
Peter W. McCallum and Thomas J. Timbario May 1982 99 p refs 2 Vol.
(Contract DE-AC05-79CS-56051)
(DE82-020493; DOE/CS-56051/7) Avail: NTIS HC A05/MF A01

The technology(ies) of alcohol utilization in highway transportation is reviewed. The use of methanol, ethanol, and certain of their derivatives in vehicles powered by spark ignition engines is treated. The results of engine, vehicle, and fuels testing are summarized. Exhaust emissions, performance and fuel economy, vehicle driveability, fuel systems materials compatibility, engine and vehicle design, fuels characterization, and environmental considerations are discussed. Important properties of selected alcohols and alcohol-derived fuels are described. DOE

N83-12256# Idaho Univ., Moscow.
GASIFICATION KINETICS FOR BIOMASS DECOMPOSITION Annual Report, Jul. 1980 - Jun. 1981
G. M. Simmons, S. Ramachandran, and W. Lee Jul. 1981 36 p refs
(Contract GRI-5080-363-0306)
(PB82-199043; GRI-81/0026) Avail: NTIS HC A03/MF A01 CSCL 21D

An extensive literature review has been completed on the thermal decomposition of cellulose and wood. A possible reaction path has been proposed. Experimental decomposition experiments which determine the rate of gas formation, as opposed to weight loss, have identified at least two separate rate constants which are consistent with the suggestion of competing reactions. Future work will incorporate detailed modeling of transport processes to ascertain the limits and dependencies of reactor rates on heat and mass transfer. GRA

N83-12257# Joyce (T. J.) Associates, Fairfax, Va.
ASSESSMENT OF RESEARCH AND DEVELOPMENT NEEDS FOR METHANE FUELED ENGINE SYSTEMS Final Report, Aug. 1981 - Mar. 1982
T. J. Joyce Mar. 1982 187 p refs
(Contract GRI-5081-310-0507)
(PB82-199035) Avail: NTIS HC A09/MF A01 CSCL 21D

The most significant technical, economic and institutional problems which have limited the use of natural gas as a fuel for stationary and mobile engines were identified and a research and development plan which would, if successful, resolve them was prepared. Problem identification was carried out through a mail canvass of equipment suppliers, vehicle operators, gas utilities and government organizations plus personal interviews with a number of the respondents. Research and development programs to develop improved equipment for use of compressed natural gas and liquefied natural gas as a vehicle fuel were reviewed.
GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-12258# Cape Town Univ. (South Africa). Nonlinear Structural Mechanics Research Unit.

AN EVALUATION OF THE INELASTIC BEHAVIOUR OF TWO DEGREE OF FREEDOM STRUCTURES UNDER EARTHQUAKE LOADING

J. F. Bagget and J. B. Martin Oct. 1981 35 p refs

(TR-9) Avail: NTIS HC A03/MF A01

Two degree of freedom systems were studied. A accelerogram, from an artifically generated motion with a maximum acceleration of about 0.3 g was used. It is in fact the strong motion portion of a longer record, and was limited to 5 seconds duration to reduce the use of computer time S.L.

N83-12259*# Colorado State Univ., Fort Collins. Dept. of Physics.

INDUSTRIAL ION SOURCE TECHNOLOGY Annual Report

Harold R. Kaufman and Raymond S. Robinson Dec. 1979 67 p refs

(Grant NsG-3086)

(NASA-CR-159877; NAS 1.26:159877) Avail: NTIS HC A04/MF A01 CSCL 13H

In reactive ion etching of Si, varying amounts of O2 were added to the CF4 background. The experimental results indicated an etch rate less than that for Ar up to an O2 partial pressure of about .00006 Torr. Above this O2 pressure, the etch rate with CF4 exceeded that with Ar alone. For comparison the random arrival rate of O2 was approximately equal to the ion arrival rate at a partial pressure of about .00002 Torr. There were also ion source and ion pressure gauge maintenance problems as a result of the use of CF4. Large scale (4 sq cm) texturing of Si was accomplished using both Cu and stainless steel seed. The most effective seeding method for this texturing was to surround the sample with large inclined planes. Designing, fabricating, and testing a 200 sq cm rectangular beam ion source was emphasized. The design current density was 6 mA/sq cm with 500 eV argon ions, although power supply limitations permitted operation to only ^ mA/sq cm. The use of multiple rectangular beam ion sources for continuous processing of wider areas than would be possible with a single source was also studied. In all cases investigated, the most uniform coverage was obtained with 0 to 2 cm beam overlay. The maximum departure from uniform processing at optimum beam overlap was found to be +15%. S.L.

N83-12260# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).

MEASUREMENT TECHNIQUES IN TURBOMACHINES

1981 531 p refs Lecture held at Rhode-Saint-Genese, Belgium, 18-22 May 1981

(VKI-LS-1981-7) Avail: NTIS HC A23/MF A01

Advances in turbomachinery components performance and flow phenomena in compressors and turbines were examined. Modern experimental techniques used in aerodynamic and thermodynamic flow field investigations are presented. Covered are: (1) experimental techniques and sensors used in prototypes and industrial testing; (2) mechanics for clearance, vibration, stress and heat transfer measurements for stationary and blade rows; (3) progress in localized measurements of aerodynamic and thermal quantities by lasers in compressors and pumps; and (4) data transmission for slipring and telemetry systems. For individual titles, see N83-12261 through N83-12275.

N83-12261# Pratt and Whitney Aircraft, East Hartford, Conn.

INTRODUCTION: MEASUREMENTS OF STEADY STATE FLUID DYNAMIC QUALITIES c37

W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 38 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

Measurement technology for turbomachinery was examined. Gas turbine engines where efforts to improved performance and durability while limiting the generation of acoustic noise, smoke and gaseous emissions has produced intensive efforts to advance the theoretical understanding of structures, aerodynamics, combustion and heat transfer and to generate suitably validated design systems are discussed. Measurements which provide all the fundamental data necessary to support the theoretical base of the technology and permit unequivocal validation of design results by direct measurement of all critical parameter of the design such as maximum operating temperature, strain level, efficiency are presented. Measurement techniques in combustors and turbines present the greatest technical challenge. E.A.K.

N83-12262# Pratt and Whitney Aircraft, East Hartford, Conn.

MEASUREMENT OF NON-STEADY FLUID DYNAMIC QUANTITIES c37

W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 27 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

Nonsteady measurements in gas turbine both to improve the state of the art in steady state measurements and also to investigate a wide variety of essentially dynamic phenomena in gas turbines are discussed. Essentially all fluid dynamic quantities in gas turbine engines are nonsteady. Unsteady flow phenomena have a strong impact on efficiency, aerodynamic stability, heat transfer and noise generation. The basic model of wake transport, which shows how rotor blade wake fluid is transported toward the pressure side of the stator, is described. This fluid then appears in the stator wake. The propagation of fixed pressure and flow disturbances downstream through rotating blades is described. It is suggested that in selecting the location of fixed probes and interpreting their output it is necessary to be aware of these wake transport phenomena. E.A.K.

N83-12263# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.

PROBLEMS OF MEASUREMENT OF DYNAMIC WALL PRESSURES c37

R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 18 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

The items necessary for the acquisition, recording and analysis of dynamic pressure data are discussed. How this type of measurement is accomplished, what equipment is needed, how it is interconnected, and how the data come out are emphasized. Results of measurements made at the 2000 HP compressor research facility are presented. The block diagram is representative of a typical dynamic pressure measurement system. E.A.K.

N83-12264# Pratt and Whitney Aircraft, East Hartford, Conn.

MEASUREMENT OF METAL TEMPERATURE HEAT FLUX AND STRAIN c37

W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 25 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

The durability of engine hardware which depends on the accurate prediction of temperatures, temperature gradients and stress, both under steady state and transient operation conditions is discussed. The temperature distribution through a film cooled wall represents a typical situation in cooled components of gas turbine. The principle quantities potentially accessible to measurement are the gas temperature Tg, the coolant temperature Tc, thermal barrier surface temperature Tb as well as metal temperatures Tmi and Tmo. The convective heat flux QC cannot be measured directly, however, the total heat flux and the radiative heat flux can in principal at least be measured and from this the film cooling effectiveness could be obtained. The stress in turbine structures is also a critical ingredient in predicting lifetime of hardware. In high temperature turbines failure is dominated by

creep rupture, low cycle fatigue, creep fatigue interaction or corrosion and erosion. To predict failure in creep requires knowledge of the steady state distribution of temperature and stress. Corrosion is also strongly temperature dependent. Low cycle fatigue is determined by transient temperature and stress distributions generated by the accelerations and decelerations accompanying landing, takeoff, and flight maneuvers. E.A.K.

N83-12265# Brown, Boverie und Cie, A.G. Baden (Switzerland). Optical Measurement Technique Group.
VIBRATION AND CLEARANCE MEASUREMENTS ON ROTATING BLADES USING STATIONARY PROBES c37
H. Roth *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 36 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Rotating blades of large turbomachines are among the most strongly stressed elements found. Besides enormous centrifugal forces, alternating forces may excite vibrations which cause additional dynamic stresses. As the fluid flow within a turbomachine is not homogeneously distributed, rotating blades are submitted to periodic forces. If one of the natural frequencies of the blade is an even multiple of the revolution frequency, resonance excitation could produce dangerous vibrations. Avoidance of resonance at normal running conditions should be avoided. Tolerances in machining and especially uncertainties in the mounting of the blades in the rotor, however, will cause deviations from the precalculated values. One or several blades of a stage can be dangerously near a resonant excitation. To increase the safety and the reliability of turbomachinery is to check the vibrations by strain gage measurements, especially if a new type of blades is considered. E.A.K.

N83-12266# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
APPLICATION OF STRAIN GAUGES AND THERMOCOUPLES TO ROTATING AND STATIONARY HARDWARE c37
R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 16 p ref (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

The application of strain gages in a reliable manner to rotating turbomachinery airfoils is discussed. The method described is designed for use on integral rotors at temperatures below approximately 225 C. Low temperature applications of polymide strain gages below 260 C are discussed. E.A.K.

N83-12267# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
SIGNAL TRANSMISSION VIA SLIPRINGS AND TELEMETRY c37
R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Fluid Dyn. 1981 46 p (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Problems in turbomachinery instrumentation and the recovery of data from high speed rotors are examined. Either telemetry or slip rings are used to obtain data. The only viable method of recovering core rotating data is with the use of a telemetry system, since a slip ring which requires access to the end of the high speed spool shaft is unavailable. This situation will usually exist in multispool machines. Fan rotating data, on the other hand, are obtained by a slip ring or a telemetry system. System measurement capacity is considered. The best current high speed slip ring can handle 100, two wire signals, either strain or temperature, in any mix. The latest telemetry system has a limit of 40 channels of dynamic strain. Thermocouple transmitters can multiplex up to six temperature measurements per channel. E.A.K.

N83-12268# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.
INTRODUCTION TO LASER ANEMOMETRY STUDIES IN TURBOMACHINERY c36
R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 20 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

The design and operating principles of laser doppler anemometer systems for measuring turbomachine flows are reviewed. Signal characteristics, signal processing, and data analysis are discussed. The special case of measuring flows with large turbulence intensities is considered. Finally, the sources of noise and particle seeding techniques are described. M.G.

N83-12269# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.
ANALYSIS OF LASER DOPPLER ANEMOMETER DATA ARISING FROM HIGH SPEED TURBOMACHINERY STUDIES c36
M. E. Gill, C. Forster, and R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 23 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

The laser Doppler velocimetry technique and data analysis methods used to measure the air velocities just outside the impeller of a small high speed centrifugal compressor are described. The difficulties encountered in applying the laser technique to this area are increased by high tip speeds of around 400 m/s, flow passage widths of the order of 7mm, and blade passing frequencies of up to 24KHz. Processing of the data was achieved by photon correlation and a fourier transform data reduction procedure. M.G.

N83-12270# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.
INITIAL FINDINGS DURING STUDIES OF THE FLOW WITHIN A HIGH SPEED IMPELLER USING A TRANSIT ANEMOMETER c34
M. E. Gill, C. Forster, and R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 15 p refs Presented at the 4th Intern. Conf. on Photon Correlation Tech. in Fluid Mech., Stanford, Calif., Aug. 1980 (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Problems involved in conducting flow measurements at blade frequencies of up to 24 KHz and within very small passages are addressed. Some results are shown of measurements taken just outside a centrifugal compressor impeller using an oblique forward scatter Doppler system. The development of a two spot capability which was established to provide measurements within rotating blade passages where a forward view is not possible is also discussed. M.G.

N83-12271# Glasgow Univ. (Scotland). Dept. of Aeronautics and Fluid Mechanics.
MEASUREMENT TECHNIQUES FOR HEAT TRANSFER IN THE TURBINE USING SHORT DURATION WIND TUNNEL TECHNIQUES c34
B. E. Richards *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 41 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Heat transfer measurement techniques used in conjunction with short duration (under 1 sec.) wind tunnel methods are discussed. Particular emphasis is given to the isentropic light piston concept and its use in cascade tunnels. The use of one such cascade tunnel in the measurement of film cooling effectiveness in gas turbines is described. M.G.

N83-12272# National Aerospace Lab., Amsterdam (Netherlands).
LASER DOPPLER MEASUREMENTS IN TRANSPARENT PUMP IMPELLERS c37
H. Kannemans *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 50 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Two different shrouded fully transparent pump impellers with thin backswept blades were built and the velocity distribution in

the rotating flow channel was measured using a laser Doppler velocimeter. One impeller was two dimensional and radial; the other one was of the mixed-flow type. Two components of the velocity were measured at different radial cross sections and for different flow rates. The results show that the flow is highly influenced by viscous effects. In the radial impeller experimental data and potential flow theory calculations agree at medium and high flow rate. M.G.

N83-12273# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Groupe de Recherches.
MEASUREMENT TECHNIQUES IN TURBOMACHINES, ULTRA-THIN TRANSDUCERS APPLIED TO MEASUREMENTS IN TURBOMACHINES c35
J. Paulon, M. Portat, J. C. Godefroy, and E. Szechenyi *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 27 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

A set of thin film transducers of three types intended respectively for the measurement of pressures, temperatures, and heat fluxes are described. In parallel with the results obtained with these transducers, some information on the use of more conventional thin transducers during studies of aeroelasticity and of the operation of a compressor in transient regime is presented. M.G.

N83-12274# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Dept. of Turbomachinery.
HOT WIRE THERMAL TUFT DEVELOPMENT FOR MEASUREMENT OF FLOW REVERSAL NEAR A COMPRESSOR BLADE c35
B. Gyles and P. M. Ligrani *In its* Meas. Tech. in Turbomachines 1981 47 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

A hot wire thermal tuft probe which is suitable for mounting on a rotor blade of an axial flow compressor was developed. The probe was subjected to a number of qualification tests to determine its behavior under various flow conditions. The probe was then installed in a low speed axial flow compressor and measurements were taken while the machine was operating in rotating stall in order gain an understanding of stall-associated events. M.G.

N83-12275# Rolls-Royce Ltd., Derby (England). Electronics and Instrumentation Group.
BLADE PRESSURE MEASUREMENTS c34
J. W. H. Chivers *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 21 p (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

Three measurement techniques which enable rotating pressures to be measured during the normal operation of a gas turbine or a component test rig are described. The first technique was developed specifically to provide steady and transient blade surface pressure data to aid both fan flutter research and general fan performance development. This technique involves the insertion of miniature high frequency response pressure transducers into the fan blades of a large civil gas turbine. The other two techniques were developed to measure steady rotating pressures inside and on the surface of engine or rig turbine blades and also rotating pressures in cooling feed systems. These two low frequency response systems are known as the 'pressure pineapple' (a name which resulted from the shape of the original prototype) and the rotating scanivalve. M.G.

N83-12276# Coates (Joseph F.), Inc., Washington, D.C.
THE CONSEQUENCES OF METRIC PRODUCTION FOR SMALL MANUFACTURERS. VOLUME 2: CASE STUDIES OF LARGE BUSINESS-SMALL BUSINESS INTERACTIONS
Henry H. Hitchcock, Joseph F. Coates, Marcy M. Canavan, Grant H. Prillaman, and M. Suzanne Nettles 8 Feb. 1982 284 p Sponsored by the National Metric Board 2 Vol.
(AD-A118634) Avail: NTIS HC A13/MF A01 CSCL 13/8

Over the last decade, controversy, concern, and conjecture have surrounded the effects of metric conversion on small business. Enthusiasts for metric argue that conversion would benefit small businesses in two ways. It would expand their markets, especially export markets. It would also improve business by making production processes more rational. Dissenters argue that conversion is unnecessary and possibly harmful to the majority of the nation's small businesses. Against this backdrop, the U.S. Metric Board is fulfilling its statutory mission to find out what happens to small businesses that convert to metric. The first phase of the project was a search for small businesses that had made substantial investments in converting to metric. That search showed that small businesses were most likely to invest in metric production in response to large corporations' needs for metric parts and products. The second phase of the research consisted of three case studies of the effects of large companies' conversion on small business suppliers. The team studied how the conversion of a General Electric Company department, two Ford Motor Company product lines, and three divisions of Ingersoll-Rand affected their small business suppliers. GRA

N83-12277# Coates (Joseph F.), Inc., Washington, D.C.
THE CONSEQUENCES OF METRIC CONVERSION FOR SMALL MANUFACTURERS. VOLUME 1: SUMMARY REPORT Final Report
Henry H. Hitchcock and Joseph F. Coates 8 Feb. 1982 35 p refs 2 Vol.
(Contract AA-80-SAC-X8604)
(AD-A118633) Avail: NTIS HC A03/MF A01 CSCL 13/8

Metric production capability for America's small manufacturers is wide spread but shallow. There has been little costs to firms to produce metric products. Conversion is spurred by demands of current customers. Metric production presents few problems for small manufacturers. The small manufacturers have not benefited from the conversion except to keep the business of their customers that convert to metric. Metric conversion for small manufacturers is neither forced nor timely voluntary. They follow the general trends in the industry they serve. Metric production is considered by small manufacturers as a routine aspect of doing business. Author (GRA)

N83-12278# Coates (Joseph F.), Inc., Washington, D.C.
METRIC USE IN THE TOOL INDUSTRY. A STATUS REPORT AND A TEST OF ASSESSMENT METHODOLOGY Final Report
W. Edward Cushen 20 Apr. 1982 114 p refs
(Contract USMB-1-0581)
(AD-A118632) Avail: NTIS HC A06/MF A01 CSCL 13/8

This study served a dual purpose of testing the most promising methods of assessing metric status in the United States while providing an assessment of the current status and progress of metrication activities of the machine tool industry. The machine tool industry provides capital equipment for other manufacturing industries including the automotive, aerospace, construction, and farm machinery industry. It is a small but critical segment of the national economy. There have been a number of studies of industrial metrication, but they dealt with broad categories of industry and provided little detailed information about specific industries or about the process. This study draws directly on the experience of industry companies and on data from many public and private sources. Some of the major findings are: (1) Metrication is progressing slowly but steadily in the U.S. Machine Tool Industry. (2) The U.S. Machine Tool Industry meets overseas demand and the small domestic demand for metric tools by building metric-capable machines. (3) The serious decline of the U.s. share of the world market has been somewhat masked by the fact that the dollar volume of U.S. overseas sales has increased. (4) Because of the paucity of data, assessment of metric status in specific industries cannot be handled through econometric modeling or aggregation of massive amounts of statistical data. Author (GRA)

N83-12279# Middlesex Research Center, Inc., Washington, D.C.
EFFECTS OF METRIC CHANGE ON SAFETY IN THE WORKPLACE FOR SELECTED OCCUPATIONS Final Report
Judith M. LeFande and Joseph L. Pokorney 21 Apr. 1982 139 p

(Contract AA-80-SAC-X8605)
(AD-A118595) Avail: NTIS HC A07/MF A01 CSCL 13/12

The study assesses the potential safety issues of metric conversion in the workplace. A purposive sample of 35 occupations based on injury and illnesses indexes were assessed. After an analysis of workforce population, hazard analysis and measurement sensitivity of the occupations, jobs were analyzed to identify potential safety hazards by industrial hygienists, safety engineers and academia. The study's major findings were as follows: No metric hazard experience was identified. An increased exposure might occur when particular jobs and their job tasks are going the transition from customary measurement to metric measurement. Well planned metric change programs reduce hazard potential. Metric safety issues are unresolved in the aviation industry. Author (GRA)

N83-12280# United States Metric Board, Arlington, Va. Office of Research.
RESEARCH OVERVIEW AND ANALYSIS Final Report
Apr. 1982 131 p refs
(AD-A118594) Avail: NTIS HC A07/MF A01 CSCL 13/8

The Research Overview and Analysis report by the USMB's Research Staff provides a comprehensive review and analysis of metric research. As part of this effort, the project reviewed all Board research studies, the General Accounting Office's study, the National Bureau of Standard's U.S. Metric Study, as well as other metric studies and surveys. Author (GRA)

N83-12281# Bendix Corp., Kansas City, Mo.
UNIVERSAL TOOLING FOR THE DAVIS AND WILDER MODEL 1033 SPLIT CYLINDRICAL CHAMBER VACUUM-DEPOSITION SYSTEM
C. E. Lindsey Aug. 1982 17 p refs
(Contract DE-AC04-76DP-00613)
(DE82-020364; BDX-613-2816) Avail: NTIS HC A02/MF A01

The Davis and Wilder Model 1033 vacuum deposition system which is capable of precision deposition of various metals on planar and nonplanar substrates was examined. Required tooling must rotate in a vacuum while exposed to high heat and deposition vapors. The tooling also must function without requiring extensive cleanup or expensive repair time and must have change over capability for several geometries. It is conducted that developed universal tooling meets these requirements. DOE

N83-12282# TRW Defense and Space Systems Group, Redondo Beach, Calif.
TOWARDS WIND-AIDED FLAME SPREAD ALONG A HORIZONTAL CHARRING SLAB: THE STEADY-FLOW PROBLEM Final Report
G. Carrier, F. Fendell, and S. Fink Feb. 1982 88 p refs
(Contract NB80-NADA-1065)
(PB82-183732; NBS-GCR-82-377) Avail: NTIS HC A05/MF A01 CSCL 13M

The spread of fire across the ceiling of a large room (or long corridor) in a structure is modeled as wind-aided flame spread along a horizontal char-forming thick slab, in the presence of significant convective, diffusive, and radiative transport. The goal is to predict the rate of streamwide advance of the site on the solid-gas interface at which the pristine solid undergoes endothermic degradation to a combination of (1) a porous carbonaceous heat retaining matrix, and (2) a mixture of partially combustible vapors that move through the matrix to the outer gas. This rate of advance of the thermal degradation site is sought as a function of normally available data concerning the thermodynamic and physical properties of the solid and the thermodynamic and dynamic state of the hot vitiated bulk gas that flow over the slab. A nonlinear, unsteady, two dimensional, treatment in the Shvab-Zeldovich approximation entails boundary layer simplification in the manner of Prandtl convective transport simplification in the manner of Oseen, and thin flame simplification in the manner of Burke and Schumann. The formulation given here is general and is limited to the steady state problem. Author (GRA)

N83-12283# Georgia Inst. of Tech., Atlanta.
LOCATING VOIDS BENEATH PAVEMENT USING PULSED ELECTROMAGNETIC WAVES Final Report
W. J. Steinway, J. D. Echard, and C. M. Luke Nov. 1981 49 p Sponsored in part by the Federal Highway Administration
(Contract HR-10-14)
(PB82-185513; NCHRP-237) Avail: NTIS HC A03/MF A01 CSCL 13B

The feasibility of using pulsed electromagnetic wave technology for locating and sizing voids beneath reinforced and nonreinforced portland cement concrete pavements is determined. The data processing techniques developed can be implemented to provide information for void depth and sizing to + or - 1/2 in. and spatial location within + or - 6 in. A very short pulse radar directly connected to a microcomputer was chosen as the equipment necessary to obtain measurements. This equipment has the required accuracy and reliability, and is a cost effective solution for the void locating problem. The radar provides a signal return from voids that has unique characteristics that can be examined to provide information regarding the location, depth, and shape of the void. The microcomputer provides a means of real time processing to extract the information from the radar signal return and record the results. Theoretical modeling of signal returns from voids led to suitable techniques for locating and sizing voids beneath the pavement. Analysis and application of these techniques to radar measurements verified the theoretical predictions that radar can be used to determine the location, size, and shape of actual voids. GRA

N83-12284# Virginia Highway and Transportation Research Council, Charlottesville.
EVALUATION OF CHEM-CRETE Interim Report, 26 Aug. 1980 - Jan. 1982
G. W. Maupin, Jr. Jan. 1982 25 p refs Sponsored by Federal Highway Administration
(PB82-187808; VHTRC-82-R30; FHWA/VA-82/30) Avail: NTIS HC A02/MF A01 CSCL 13C

Two test sections, one on new construction and the other on a maintenance resurfacing project, were installed to evaluate the proprietary asphalt product Chem-Crete. Dynaflect and density measurements were performed on the experimental and control mixes and the performance of the pavements is being evaluated. Raveling was noticed, especially in the Chem-Crete mix, approximately 2 months after paving; however, the deterioration stabilized shortly thereafter. Traffic appeared to heal the control mix; however, some deep raveling and several potholes remain in the Chem-Crete portions. The high-absorption sand used in the mixes was partially responsible for the failures. Pavement deflections were not reduced significantly in either of the overlaid sections. Strength did not develop as rapidly in either mix on the pavement as it did in specimens prepared and cured at 140 F (60 C) in the laboratory. There was no significant difference between the results of stripping tests on the control mix and those on the Chem-Crete mix prepared in the laboratory. GRA

N83-12285# Moreland Associates, Fort Worth, Tex.
EARTH-COVERED BUILDINGS: AN EXPLORATORY ANALYSIS FOR HAZARD AND ENERGY PERFORMANCE Final Report, Sep. 1979 - Nov. 1981
Frank L. Moreland Nov. 1981 314 p
(PB82-189564; MAI-81) Copyright. Avail: NTIS HC A14/MF A01 CSCL 13M

The performance of earth covered buildings is examined regarding storms, nuclear detonations, earthquakes, fire, nuclear radiation, energy consumption, compatibility with solar energy systems, peak load effects, soil and groundwater effects, air and climate effects, occupant evaluation, and resource management. Potential longterm benefits are assessed, including the areas of economic benefits, community benefits and security benefits. GRA

N83-12286# Purdue Univ., Lafayette, Ind. Dept. of Civil Engineering.
EFFECTS OF GAIN AND DELAY TIME OF CONTROL DEVICES

TO STRUCTURAL STUDY
M. A. Basharkhah and J. T. Yao Jan. 1982 51 p refs
(Grant NSF CME-80-18963)
(PB82-194152; NSF/CEE-82001) Avail: NTIS HC A04/MF A01 CSCL 13M

The effects of several combinations of gain and delay time on the control of such flexible structures as tall buildings and long bridges are studied. Investigations of active structural control, active damping of large structures in winds, antiearthquake application of pulse generators, active feedback control, modal synthesis, and modal control are reviewed. To reduce undesirable effects of disturbances, the feedforward control system, the feedback control system, or a combination of the two may be used. Ways to minimize the effects of the disturbance force are examined. An example is provided of a single-degree-of-freedom structural system subjected to an artificially generated earthquake. It is found that the larger the gain and the smaller the delay time, the more effective the control system will be. GRA

N83-12287# National Bureau of Standards, Washington, D.C. National Engineering Lab.
ANALYTICAL AND EXPERIMENTAL ANALYSIS OF PROCEDURES FOR TESTING SOLAR DOMESTIC HOT WATER SYSTEMS Final Report
A. H. Fanney, W. C. Thomas, C. A. Scarbrough, and C. P. Terlizzi Feb. 1982 161 p refs Prepared in cooperation with the Virginia Polytechnic Inst. and State Univ. Sponsored in part by DOE
(PB82-184839; NBS-BSS-140-LC-81-600191) Avail: NTIS HC A08/MF A01 CSCL 13A

Three experimental techniques which allow the net thermal output of an irradiated solar collector array to be reproduced indoors without the use of a solar simulator are investigated. These techniques include use of an electric heat source only, use of a nonirradiated collector array in series with an electric heat source, and the use of electric strip heaters which are attached to the back of nonirradiated absorber plates. Expressions are developed to compute the input power required for each experimental technique. Solar collectors connected in parallel and series combinations are considered. GRA

N83-12288# New England River Basins Commission, Boston, Mass. Dredge Management Team.
THE DREDGING DILEMMA: SYSTEM PROBLEMS AND MANAGEMENT SOLUTIONS
Sep. 1981 33 p
(PB82-184979) Avail: NTIS HC A03/MF A01 CSCL 13B

Contents: (1) understanding the dredging process; (2) what's wrong with dredging--A system assessment; (3) improving the dredging management system; (4) how dredging management planning could work in New England; (5) Federal cost recovery legislation--prospects and effects; and (6) West Coast experiments with dredging management planning. GRA

N83-12289# National Mechanical Engineering Research Inst., Pretoria (South Africa). Fluid Mechanics Div.
PIPELINE TRANSPORTATION OF SOLIDS: RECENT DEVELOPMENTS IN HYDRAULIC PIPELINES
H. B. Sauermann 1981 17 p refs
(PB82-206863; MEF/4068) Avail: NTIS HC A02/MF A01 CSCL 13B

From a literature survey and from proceedings of conferences, a review of the present state of the art of hydraulic transportation of solids is presented. GRA

N83-12290# National Building Research Inst., Pretoria (South Africa).
NEW DIRECTIONS IN OFFICE PLANNING: THE INFLUENCE OF THE FIRE PROPERTIES OF MATERIALS AND COMPONENTS ON FIRE SAFETY
G. R. Basson 1982 12 p refs
(PB82-191214) Avail: NTIS HC A02/MF A01 CSCL 13M

The fire properties of some materials and building components used in modern office buildings are described. Recommendations are made on the selection and use of materials and components to ensure a reasonable degree of passive (built-in) free-safety without detracting from the functionality and flexibility of buildings. Author (GRA)

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-12291# Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
A REGRESSIVE MODEL OF ISOCHRONISM IN SPEECH UNITS [REGRESYJNY MODEL IZOCHRONIZMU ZESTROJOWEGO W SYGNALE MOWY]
Wiktor Jassem, Miroslaw Krzysko, and Przemyslaw Stolarski 1981 36 p refs In POLISH
(ISSN-0208-5658) Avail: Issuing Activity

To define linguistic isochronism in quantitative terms, a statistical regressive method of analyzing the number of rhythmic units in human speech was employed. The material used was two taped texts spoken in standard British English totaling approximately 2,500 sounds. The sounds were divided into statistically homogeneous classes, and the mean values in each class were utilized in regressive models. Abercrombie's theory of speech rhythm postulating anacrusis and Jassem's theory postulating two types of speech units, anacrusis and a rhythmic unit in the strict sense, were tested using this material. Transl. by J.D.

N83-12292# British Broadcasting Corp., Kingswood (England). Engineering Div.
STEREOPHONIC AND TWO CHANNEL SOUND IN TERRESTRIAL TELEVISION BROADCASTING
S. M. Edwardson Sep. 1982 10 p refs
(BBC-RD-1982/18) Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

The possibility of adding stereophonic sound to existing television services is investigated. A number of possible methods exist for the transmission and reception of the additional sound signal required for stereo and some of them are also suitable for the transmission of independent sound signals, such as may be required for a bilingual service. Several of these possibilities are described. A two carrier system was tested, but results, indicate that there may be difficulty in providing a signal that would be both compatible with existing receivers and able to provide a two channel service over the existing coverage area. S.L.

N83-12293# British Broadcasting Corp., Kingswood (England). Engineering Div.
THE INTRODUCTION OF MIXED POLARIZATION FOR VHF SOUND BROADCASTING: THE WROTHAM INSTALLATION
G. H. Millard Sep. 1982 14 p refs
(BBC-RD-1982/17) Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

The polarization of VHF/FM radio network transmitters from horizontal to mixed was changed. The high power station which as changed to this standard is described and its performance given. S.L.

N83-12294# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMPRESSION/DEPRESSION OF IMAGES FROM METEOROLOGICAL SATELLITES FOR TRANSMISSION BY TELEPHONE [COMPRESSAO/DECOMPRESSAO DE IMAGENS DE SATELITES METEOROLOGICOS PARA TRANSMISSAO POR VIA TELEFONICA]
Juan Carlos Pinto deGarrido Apr. 1982 136 p refs In PORTUGUESE; ENGLISH summary
(INPE-2373-NTE/183) Avail: NTIS HC A07/MF A01

The very large data bulk concerned with the high resolution meteorological satellites images requires the use of compression techniques to transmit them, by telephone lines, in a useful time and without sensitive quality degradation. The compression system is based on the adapative delta/DPCM codification technique and satisfies these conditions thoroughly. The codification is implemented by software and uses the delta mode (on bit per pixel) to code the regions of smooth changes that prevail in the images, and the DPCM mode (three bits per pixel) in regions of sharper changes. The decompressor permits the reconstruction of the image transmitted. Author

N83-12295# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ASYMPTOTIC THEORY OF THE SCATTERING OF AXIALLY SYMMETRIC REFLECTORS M.S. Thesis [TEORIA ASSINTOTICA DE ESPALHAMENTO DE REFLETORES AXIALMENTE SIMETRICOS]
Carlos Alberto Iennaco Miranda May 1982 107 p refs In PORTUGUESE; ENGLISH summary
(INPE-2402-TDL/089) Avail: NTIS HC A06/MF A01

The field scattered by a general surface of revolution when illuminated by linearly, circularly, or elliptically polarized feeds, can be calculated by the physical optics method, which consists of the integration of the current induced in the refector surface. Generally, the field integrals can not be carried out analytically and it is necessary to use numerical methods. By the asymptotic physical optics method, the integrals that yield the scattered field can be evaluated analytically by the method of stationary phase. The methods of physical optics and its asymptotic approximation were compared with the uniform geometrical theory of diffraction. The radiation patterns obtained for parabolic and hyperbolic surfaces, using the formulation developed in the three methods, were compared. It is found that with the asymptotic methods, there is an appreciable reduction in the processing time for the calculation of the radiated field. For large reflectors it is advantageous to use the approximation of physical optics, since it yields the radiation patterns with good accuracy, when compared to the full physical optics solution. Author

N83-12296# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RECOMMENDATIONS FOR A STANDARD ELECTRONIC MAIL SYSTEM TO BE USED BY SPACE AGENCIES IN THE DEVELOPMENT OF CROSS-SUPPORTED SPACE DATA SYSTEMS
Eduardo Whitaker Bergamini and Carlos Sergio Castilho Pratti Sep. 1982 53 p Presented at the Meeting of the Consultat. Comm. on Space Data Systems, Toulouse, 4-8 Oct. 1982
(INPE-2533-PRE/199) Avail: NTIS HC A04/MF A01

Basic recommendations for a standardized electronic mail service are proposed. Within the scope of the Consultative Committee on Space Data Systems, an electronic mail service standard is an important objective to be adopted as a common tool in the development of cross-support concepts for space data systems. The proposed recommendations are based on currently used computer systems. Different classes and means of information exchange are considered. Basic specifications are given for input/output compatibilization. Concepts to be used in report segmentation, coding and storage are proposed, based on a well structured file organization. A basic protocol for online data communication is also proposed. Considerations on cost effectiveness of onand offline data transport are made. Needs for further developments are pointed out. Author

N83-12297# Lincoln Lab., Mass. Inst. of Tech., Lexington.
MODE S INSTALLATION AND SITING CRITERIA
Ronald G. Sandhorn 13 Sep. 1982 32 p refs Revised
(Contracts DOT-FA72WAI-261; F19628-80-C-0002)
(ATC-99-Rev-A; FAA-RD-82-58) Avail: NTIS HC A03/MF A01

Site associated phenomena that affect the proper operation of a Mode S sensor and therefore warrant serious consideration when siting a sensor are discussed. Siting criteria as they relate to the Mode S sensor antenna system, as opposed to the ATCRBS hogtrough antenna are considered, and those characteristics of the surrounding environment that are crucial to proper Mode S surveillance are addressed. S.L.

N83-12298# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
RECOMMENDATIONS FOR AUTOMATED MONITORING OF RADIO EQUIPMENT ASSOCIATED WITH FLIGHT SERVICE STATIONS Final Report, Feb. - Oct. 1981
Albert J. Rehmann Aug. 1982 65 p refs
(FAA Proj. 144-170-900)
(FAA-CT-82-31) Avail: NTIS HC A04/MF A01

The radio equipment associated with flight service stations and back-up emergency communications radio equipment was examined. Radio parameters critical to remote maintenance monitoring were identified as necessary for remote certification, remote maintenance, or remote control. The parameters are grouped according to function. The functional characteristics of test functional modules (TFM) are defined according to the parameter grouping. Finally, limited recommendations for the electrical characteristics and operating specifications of each TFM are given. S.L.

N83-12299# Ohio Univ., Athens. Avionics Engineering Center.
THE EFFECTS OF PRECIPITATION STATIC AND LIGHTNING ON THE AIRBORNE RECEPTION OF LORAN-C. VOLUME 1: ANALYSIS Final Report, 11 Dec. 1980 - 30 Apr. 1982
James D. Nickum Apr. 1982 138 p refs
(Contract FA01-81-C-10007)
(DOT/FAA-RD-82-45-1; OU/AEC-EER-54-2) Avail: NTIS HC A07/MF A01

Results of a ground p-static survey of an aircraft to determine p-static noise reduction are given. The effects of the airborne reception of Loran-C in actual thunderstorm conditions are described. Additionally, data from flight tests conducted using an airframe biased discharger producing p-static airframe charging in flight are presented. P-static noise reduction using quality static wick dischargers to improve Loran-C reception in flight is demonstrated. Author

N83-12300# Electromagnetic Compatibility Analysis Center, Annapolis, Md.
EMC ANALYSIS OF A PROTOTYPE CIVIL USE GPS RECEIVER ON FOUR AIRCRAFT CONFIGURATIONS
Robert L. Mullen (IIT Research Inst., Annapolis, Md.) Washington FAA Jul. 1982 71 p refs Sponsored in part by FAA
(Contract F10628-80-C-0042)
(ECAC-CR-82-048; FAA-RD-82-63) Avail: NTIS HC A04/MF A01

The cosite electromagnetic compatibility aspects were evaluated for the simultaneous operation of a prototype civil-use GPS receiver and other avionic systems on board four specific aircraft configurations. Author

N83-12301# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
TELEVISION RECEIVER, 4 GHz [RECEPTOR DE TV FM EM 4 GHZ]
Janio Kono, Carlos Eduardo Santana, and Aydano Barreto Carleial Jul. 1982 24 p refs In PORTUGUESE; ENGLISH summary Original contains color illustrations
(INPE-2478-PRE/164) Avail: NTIS HC A02/MF A01

A receiver for TV signals transmitted by satellite in the 4 GHz band is described. A subjective assessment of the receiver's performance under various signal level conditions is presented. Author

N83-12302# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CIRCUITS FOR ANALOG VOICE GRADE SIGNAL PROCESSING IN SINGLE CHANNEL PER CARRIES (SCPC) FM SATELLITE COMMUNICATIONS [CIRCUITOS PARA PROCESSAMENTO ANALOGICO DO SINAL DE VOZ EM COMUNICACOES SCPC

FM POR SATELITE]
Naila Hoelz Colla and Aydano Barreto Carleial Aug. 1982 34 p refs In PORTUGUESE; ENGLISH summary
(INPE-2510-PRE/189) Avail: NTIS HC A03/MF A01

Electronic circuits to be used in FM SCPC Earth stations in order to limit the audio signal frequency band, limit the maximum carrier frequency deviation, control activation and deactivation of the carrier, suppress echoes and improve the signal-to-noise ratio obtained at the receiving end are described. The circuits were designed and are being developed in the laboratory for prototypes of small, low-capacity Earth stations. Author

N83-12303*# Environmental Research Inst. of Michigan, Ann Arbor. Radar and Optics Div.
SP MOUNTAIN DATA ANALYSIS Final Report, 11 Jan. 1980 - 10 Sep. 1981
R. F. Rawson, R. E. Hamilton, C. L. Liskow, A. R. Dias, and P. L. Jackson Sep. 1981 75 p Sponsored by NASA
(NASA-CR-169471; NAS 1.26:169471; ERIM-148000-1-F) Avail: NTIS HC A04/MF A01 CSCL 17I

An analysis of synthetic aperture radar data of SP Mountain was undertaken to demonstrate the use of digital image processing techniques to aid in geologic interpretation of SAR data. These data were collected with the ERIM X- and L-band airborne SAR using like- and cross-polarizations. The resulting signal films were used to produce computer compatible tapes, from which four-channel imagery was generated. Slant range-to-ground range and range-azimuth-scale corrections were made in order to facilitate image registration; intensity corrections were also made. Manual interpretation of the imagery showed that L-band represented the geology of the area better than X-band. Several differences between the various images were also noted. Further digital analysis of the corrected data was done for enhancement purposes. This analysis included application of an MSS differencing routine and development of a routine for removal of relief displacement. It was found that accurate registration of the SAR channels is critical to the effectiveness of the differencing routine. Use of the relief displacement algorithm on the SP Mountain data demonstrated the feasibility of the technique. B.W.

N83-12304*# Old Dominion Univ., Norfolk, Va. Dept. of Electrical Engineering Technology.
DEVELOPMENT OF COMPUTER MODELS FOR THE PREDICTION OF LARGE DISTORTED ANTENNA CHARACTERISTICS Final Report, period ending 15 Jul. 1982
Steven M. Moskowitz Oct. 1982 114 p
(Grant NAG1-63)
(NASA-CR-169479; NAS 1.26:169479) Avail: NTIS HC A06/MF A01 CSCL 20N

A program for calculating the radiation patterns of analytic reflector antennas, using geometric optics and aperture plane integration techniques, was modified and extended to include nonanalytic surfaces. The original program, while capable of predicting patterns for a variety of reflectors, both smooth and multipanelled, was subject to the restriction that the surface had to be expressed analytically, i.e., described by a set of mathematical equations. This restriction was removed by adapting a technique which allows the reflector configuration to be interpolated from a finite set of points measured on the surface. Criteria for choosing both the number and distribution of these measured surface points were developed by comparing the predicted antenna radiation patterns with measured laboratory results. Test cases involved relatively smooth as well as grossly distorted arbitrary surfaces. Finally, surface point accuracies were established by applying random error analysis to the measurement process. S.L.

N83-12305*# Texas Univ., Austin. Applied Research Labs.
COMPUTER MODELING OF A WIDESWATH SAR CONCEPT EMPLOYING MULTIPLE ANTENNA BEAM FORMATION TECHNIQUES Final Report, 28 Sep. 1981 - 27 Jun. 1982
James M. Estes 9 Sep. 1982 54 p refs
(Contract NAS9-16437)
(NASA-CR-167757; NAS 1.26:167757; ARL-TR-82-57) Avail: NTIS HC A04/MF A01

A technique for wideswath synthetic aperture radar coverage, was implemented into the OSS (orbital sar simulation) computer programs. The OSS modifications, and the implementation and simulation of the concept are described. The wideswath technique uses formed multiple antenna beams. S.L.

N83-12306*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HIGH FREQUENCY SCATTERING FROM ARBITRARILY ORIENTED DIELECTRIC DISKS
D. M. LeVine, R. Meneghini, R. H. Lang, and S. S. Seker Jun. 1982 53 p refs
(NASA-TM-83910; NAS 1.15:83910) Avail: NTIS HC A04/MF A01 CSCL 20N

Calculations have been made of electromagnetic wave scattering from dielectric disks of arbitrary shape and orientation in the high frequency (physical optics) regime. The solution is obtained by approximating the fields inside the disk with the fields induced inside an identically oriented slab (i.e. infinite parallel planes) with the same thickness and dielectric properties. The fields inside the disk excite conduction and polarization currents which are used to calculate the scattered fields by integrating the radiation from these sources over the volume of the disk. This computation has been executed for observers in the far field of the disk in the case of disks with arbitrary orientation and for arbitrary polarization of the incident radiation. The results have been expressed in the form of a dyadic scattering amplitude for the disk. The results apply to disks whose diameter is large compared to wavelength and whose thickness is small compared to diameter, but the thickness need not be small compared to wavelength. Examples of the dependence of the scattering amplitude on frequency, dielectric properties of the disk and disk orientation are presented for disks of circular cross section. Author

N83-12307# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RECEIVING STATION FOR WEFAX SIGNALS [ESTACAO RECEPTORA DE SINAIS WEFAX]
Aug. 1982 13 p In PORTUGUESE; ENGLISH summary
(INPE-2501-NTE/191) Avail: NTIS HC A02/MF A01

A WEFAX receiving station is described. This station makes use of a 1,80 m antenna as well as an image recorder. The F.I. receiver input is the same as that of the FM commercial receivers (10,7 MHz). S.L.

N83-12308*# National Aeronautics and Space Administration. Pasadena Office, Calif.
RETINALLY STABILIZED DIFFERENTIAL RESOLUTION TELEVISION DISPLAY Patent Application
Carl F. Ruoff (JPL, California Inst. of Tech., Pasadena) Filed 28 Sep. 1982 23 p
(Contract NAS7-100)
(NASA-Case-JPO-15432-1; US-Patent-Appl-SN-425204) Avail: NTIS HC A02/MF A01 CSCL 17B

A remote television viewing system employing an eye tracker is presented, wherein a small region of the image appears in high resolution, and the remainder of the image appears in low resolution. The eye tracker monitors the position of the viewer's line of sight. The eye tracker position data is transmitted to the remote television camera and control. Both the remote camera and television display are adapted to have selectable high-resolution and low-resolution raster scan modes. The position data from the eye tracker is used to determine the point at which the high-resolution scan is to commence. The video data defining the observed image is encoded in a novel format, wherein in each data field, the data representing the position of the high-resolution region of predetermined size appears first, followed by the high-resolution zone video data and then the low-resolution region data. NASA

N83-12309# Naval Research Lab., Washington, D. C. Ionosphere Effects Branch.

INITIAL RESULTS FROM HF PROPAGATION STUDIES DURING SOLID SHIELD Interim Report
D. R. Uffelman and L. O. Harnish 30 Jul. 1982 40 p refs
(AD-A118492; NRL-MR-4849) Avail: NTIS HC A03/MF A01 CSCL 20/14

In May 1981, NRL personnel manned two (2) receiver sites located at Norfolk Virginia and Fort Bragg, North Carolina to obtain 24 hour a day coverage of data available from an oblique sounder network put into operation to support the DoD Solid Shield exercises. The resulting photographic data were scaled to obtain the maximum useable frequency (MUF) vs time for each circuit recorded. One circuit was selected as a control path to provide an update to a model which predicts the MUF. Upon obtaining an update of this model using the control path, the model to compute MUF's for other paths for which data was available. Under the geomagnetically disturbed conditions which prevailed during Solid Shield, the update provided accuracies of about 1 MHz RMS with a new update required about every 3 hours to maintain this accuracy. These results may have profound implications on the design and ultimate operation of automated frequency management systems. Author (GRA)

N83-12310# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Techniques Branch.
NULLING IN LINEAR ARRAY PATTERNS WITH MINIMIZATION OF WEIGHT PERTURBATIONS
Robert A. Shore and Hans Steyskal Feb. 1982 76 p refs
(AF Proj. 2305)
(AD-A118695; RADC-TR-82-32) Avail: NTIS HC A05/MF A01 CSCL 09/5

An analysis is performed of nulling in linear array patterns subject to minimization of the weight perturbation. Both combined amplitude and phase perturbation, and phase-only perturbation are treated. The solutions obtained are interpreted in terms of cancellation beams superimposed on the initial pattern.
Author (GRA)

N83-12311# Naval Research Lab., Washington, D. C. Terrestrial Systems Branch.
POINTING PERFORMANCE OF THE 8300 SERIES DATRON ANTENNAS Final Report
James E. Kenney and Alan P. Sharman 16 Aug. 1982 14 p refs
(AD-A118660; NRL-8610) Avail: NTIS HC A02/MF A01 CSCL 09/5

A measurement program was instituted to verify the pointing integrity of several antennas in a Navy communication system. The report verifies the antenna's conformance to the original specifications and concludes that they are suitable for a planned increase in the link frequency. Author (GRA)

N83-12312# United States Metric Board, Arlington, Va.
METRIC USAGE STUDY: A LOOK AT 6 CASE HISTORIES Final Report
1982 32 p
(AD-A118601) Avail: NTIS HC A01 CSCL 13/8

This study was prepared to describe the metric experiences, good as well as bad, of a number of firms representing a cross-section of American business and industry. Their experiences show that there are problems as well as opportunities inherent in metric conversion. The six case histories presented in this publication reflect the trend, the drawbacks, and the merits of metric usage in the private sector. The United States Metric Board was created by Congress to plan and coordinate the increasing voluntary use of the metric system in the United States. This study has been developed as part of the Board's public awareness and education program. The six firms that were studied are Black and Webster, Samuel Cabot, Inc., Caterpillar Tractor, National Distillers Company, Levi Strauss & Co., and Inland Steel Company in the preparation of this publication. Author (GRA)

N83-12313# San Jose State Univ., Calif. Dept. of Electrical Engineering.
SIDELOBE MODULATION IN FAR-FIELD RADIATION PATTERNS Final Technical Report, Jun. 1981 - Jun. 1982
Gene Moriarty 1 Jun. 1982 28 p refs
(Grant AF-AFOSR-0176-81; AF Proj. 2305)
(AD-A118611; TR-82-01; AFOSR-82-0676TR) Avail: NTIS HC A03/MF A01 CSCL 20/14

In this research, the following problem is addressed: How can low sidelobes in the distant electric field or power pattern be achieved via time-modulation of the element values in a linear phased array? Time-modulation of the N array element values can result in far-field patterns whose sidelobes are severely modulated. This procedure can produce sidelobes which on the average are very low. In this research, ON/OFF switchings are programmed in a predetermined sequence to produce a specified far-field pattern with equal and ultra-low sidelobe levels. In addition, the mainbeam of the far-field pattern is kept fairly fixed. A FORTRAN program is developed to produce ON and OFF times for this modulation scheme, given a specific value of array length (N) and a desired sidelobe level (PK). GRA

N83-12314# Assistant Secretary of Defense (Intelligence), Washington, D. C. Communications, Command, Control and Intelligence Office.
MODERNIZATION OF THE WWMCCS INFORMATION SYSTEM (WIS). EXECUTIVE SUMMARY AND MAIN REPORT Final Report
31 Jul. 1982 89 p refs
(AD-A118784) Avail: NTIS HC A05/MF A01 CSCL 17/2

This document reports on the status of and describes the approach to the modernization of the WWMCCS Information System (WIS) by the recently established WIS joint programs manager. The report was prepared for the Committee on Armed Services, United States House of Representatives. The WIS encompasses the information collection, processing, and display system that includes WWMCCS ADP and related software systems, procedures and supporting telecommunications. The current WWMCCS ADP is rapidly approaching obsolesence. Modernization of the hardware and much of the WWMCCS software will be required to meet operational needs. This report addresses the requirements, system structure, acquisition approach, program management, and cost and schedule for the WIS modernization.
Author (GRA)

N83-12315# Stanford Univ., Calif. Information Systems Lab.
RESEARCH ON ADAPTIVE ANTENNA TECHNIQUES, 4 Final Report
B. Widrow, K. Duvall, R. Gooch, and W. Newman Aug. 1981 43 p refs
(Contract N00019-80-C-0483)
(AD-A118802) Avail: NTIS HC A03/MF A01 CSCL 17/4

This paper is concerned with jamming signals that can potentially defeat or partially defeat know adaptive antenna algorithms. The existence of jammers capable of troubling known adaptive arrays motivates us to develop new adaptive signal processing and array processing algorithms two of which are proposed herein. The goals of this paper are three: (a) to examine signal cancellation phenomena in adaptive beamformers, (b) to formulate approaches toward the elimination of adaptive signal cancellation phenomena, and (c) to introduce spatial dither algorithms to combat signal cancellation and break up smart jammer signals at the receiving array. GRA

N83-12316# Michigan State Univ., East Lansing. Div. of Engineering Research.
RADAR WAVEFORM SYNTHESIS FOR TARGET IDENTIFICATION Final Report, 11 May 1981 - 10 May 1982
Kun-Mu Chen 3 Jun. 1982 38 p refs
(Contract N00019-81-C-0321)
(AD-A118572) Avail: NTIS HC A03/MF A01 CSCL 17/9

A new scheme for radar detection and discrimination, the radar waveform synthesis method, is investigated. This scheme consists of synthesizing the aspect-independent, incident radar signal which excites the target in such a way that the return radar signal contains

only a single natural mode of the target in the late-time period. When the synthesized incident signal for a preselected target is applied to a wrong target, the return signal will be significantly different from the expected natural mode, thus, the wrong target can be discriminated. At alternative scheme is also developed to extract the single-mode return signal by convolving, using a computer, the required incident radar signal for the single-mode excitation with a return radar signal from the target excited by an arbitrary incident radar signal. A study on the synthesis of the K-pulse has been initiated. The progress on the experimental setup and study is reported. Author (GRA)

N83-12317# University of Southern California, Los Angeles. Dept. of Electrical Engineering.
ADVANCED COMMUNICATION SYSTEM STUDIES Final Report, 15 May 1980 - 14 May 1982
R. A. Scholtz, W. C. Lindsey, G. Papavassilopoulos, and J. Silvester 15 Nov. 1982 19 p refs
(Grant AF-AFOSR-0171-80; AF Proj. 2304)
(AD-A118561; AFOSR-82-0637TR) Avail: NTIS HC A02/MF A01 CSCL 17/2

This report summarizes the work conducted under the grant. The goals of this research were to develop performance models of multi-hop broadcast networks and then utilize these models to suggest optimal routing and control parameters. The authors decided to concentrate their initial effort on the Slotted Aloha access protocol and the generalize to other protocols later. More details can be found in the papers referenced in this report. Author (GRA)

N83-12318# McDonnell-Douglas Research Labs., St. Louis, Mo.
ALGORITHM FOR SURFACE OF TRANSLATION ATTACHED RADIATORS (A-STAR). VOLUME 1: FORMULATION OF THE ANALYSIS Final Technical Report, 17 Mar. 1980 - 16 Oct. 1981
L. N. MedgyesiMitschang and J. M. Putnam May 1982 88 p refs
(Contract F30602-80-C-0106)
(AD-A118459; RADC-TR-82-113-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 12/1

A general analytical formulation, based on the method of moments (MM) is described for solving electromagnetic problems associated with off-surface (wire) and aperture radiators on finite-length cylinders of arbitrary cross section, denoted in this report as bodies of translation (BOT). This class of bodies can be used to model structures with noncircular cross sections such as wings, fins and aircraft fuselages. GRA

N83-12319# Georgia Inst. of Tech., Atlanta. Radar Applications Div.
A FIBER OPTIC BEAM CONTROLLER FOR PHASED ARRAY RADARS Final Technical Report, 10 Dec. 1980 - 9 Feb. 1982
R. B. Efurd, E. O. Rausch, M. A. Corbin, and B. E. Huitt Griffiss AFB, N.Y. RADC Jun. 1982 136 p refs
(Contract F19628-81-C-0026; AF Proj. LDFP)
(AD-A118763; GIT/EES-A-2832; RADC-TR-82-173) Avail: NTIS HC A07/MF A01 CSCL 17/9

The objective of the research documented in this report was to determine if the accurate time delay and the broad bandwidth of fiber optics could be exploited to construct a time delay phasing device for a microwave antenna. Time delay phasing of microwave antennas is highly desirable because there is no coupling between the signal bandwidth and the antenna beam angle for a time delay antenna. This enables radiation of broad bandwidth signals necessary for close range resolution at precise angles from a phased array microwave antenna. GRA

N83-12320# Army Materiel Development and Readiness Command, Adelphi, Md. Countermeasures/Counter-Countermeasures Office.
FREQUENCY HOPPING, MULTIPLE FREQUENCY-SHIFT KEYING, CODING, AND OPTIMAL PARTIAL-BAND JAMMING
Don J. Torrieri Aug. 1982 53 p refs
(Contract MIPR-N62269/82/MP/00918)
(AD-A118585; CM/CCM-82-1) Avail: NTIS HC A04/MF A01 CSCL 17/4

The performance of frequency-hopping systems with multiple frequency-shift keying is determined for operation against optimal partial-band jamming. The effects of Reed-Solomon, binary block, convolutional, and concatenated codes are analyzed. Continuous-phase frequency-shift keying with limiter-discriminato demodulation is shown to offer potentially improved performance in frequency-hopping systems. Author (GRA)

N83-12321# Rome Air Development Center, Griffiss AFB, N.Y.
EFFECTS OF ENERGETIC PARTICLE EVENTS ON VLF/LF PROPAGATION PARAMETERS, 1979
John P. Turtle, John E. Rasmussen, and Wayne I. Klemetti Mar. 1982 85 p refs
(AF Proj. 4600)
(AD-A118790; RADC-TR-82-79; RADC-TR-82-128) Avail: NTIS HC A05/MF A01 CSCL 20/14

This report provides a summary of disturbance effects of energetic particle events on VLF/LF propagation parameters as observed by the USAF High Resolution VLF/LF Ionosounder in Northern Greenland. Disturbance effects on ionospheric reflectivity parameters, including reflection heights and coefficients, are presented along with data from a riometer, a magnetometer, and satellite particle detectors. Author (GRA)

N83-12322# Air Force Geophysics Lab., Hanscom AFB, Mass. Aerospace Instrumentation Div.
DATA TRANSMITTERS AND COMMAND RECEIVER DEVELOPMENT Final Scientific Report
Hans Laping 22 Dec. 1981 46 p refs
(AF Proj. 7659)
(AD-A118739; AFGL-TR-82-0002; AFGL-IP-307) Avail: NTIS HC A03/MF A01 CSCL 17/2

This report describes the development of a frequency-modulated VHF data transmitter, an HF frequency-shift keying low data rate transmitter and a dual-frequency HF command receiver. These units were designed for high altitude balloon control and data systems. An antenna for the data transmitter and a detector for FSK were also designed. Author (GRA)

N83-12323# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Techniques Branch.
PHASE-ONLY NULLING AS A LEAST-SQUARE APPROXIMATION TO COMPLEX WEIGHT NULLING
Robert A. Shore May 1982 21 p refs
(AF Proj. 2305)
(AD-A118722; RADC-TR-82-129) Avail: NTIS HC A02/MF A01 CSCL 09/5

A solution is presented to the problem of obtaining a least-squares fit of phase-only array weight perturbations to a set of combined phase and amplitude perturbations calculated to impose pattern nulls at prescribed sidelobe directions. It is shown that the desired least-squares fit is accomplished by taking only the phase part of the combined phase and amplitude perturbations. This method of phase-only nulling is compared in effectiveness with other phase-only pattern synthesis methods. GRA

N83-12324# McDonnell-Douglas Research Labs., St. Louis, Mo.
ALGORITHM FOR SURFACE OF TRANSLATION ATTACHED RADIATORS (A-STAR). VOLUME 2. USERS MANUAL Final Technical Report, 17 Mar. 1980 - 16 Oct. 1981
L. N. MedgyesiMitschang and J. M. Putnam May 1982 139 p 3 Vol.
(Contract F30602-80-C-0106; AF Proj. 2064)
(AD-A118497; RADC-TR-82-113-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 09/2

A hierarchy of computer programs implementing the method of moments for bodies of translation (MM/BOT) is described. The algorithm treats the far-field radiation from off-surface and aperture antennas on finite-length open or closed bodies of arbitrary cross section. The near fields and antenna coupling on such bodies are

computed. The theoretical development underlying the algorithm is described in Volume 1 of this report. Author (GRA)

N83-12325# McDonnell-Douglas Research Labs., St. Louis, Mo.
ALGORITHM FOR SURFACE OF TRANSLATION ATTACHED RADIATORS (A-STAR). VOLUME 3. COMPUTER CODES Final Technical Report, 17 Mar. 1980 - 16 Oct. 1981
L. N. MedgyesiMitschang and J. M. Putnam May 1982 243 p 3 Vol.
(Contract F30602-80-C-0106; AF Proj. 2064)
(AD-A118498; RADC-TR-82-113-Vol-3) Avail: NTIS HC A11/MF A01 CSCL 09/2

Listing of the computer codes implementing the algorithm for radiation and scattering from bodies of translation, described in Volumes 1 and 2, is given. Author (GRA)

N83-12326# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
SYSTEM CALIBRATION STRATEGIES FOR SPACEBORNE SYNTHETIC APERTURE RADAR
R. C. Beal, A. D. Goldfinger, D. G. Tilley, and W. J. Geckle Dec. 1981 62 p refs Sponsored by European Space Agency
(PB82-182502; JHU/APL-CP-084) Avail: NTIS HC A04/MF A01 CSCL 17I

Using SEASAT SAR data of land and ocean areas from both MacDonald Dettwiler and Associates and the German Space Operations Center, this report investigates several aspects of system calibration by examining systematic properties of the data for a variety of scenes and environmental conditions. By exploiting a variety of targets in the form of point sources and homogeneous land and ocean scenes, a number of fundamental system descriptors may be extracted from the data themselves. Author (GRA)

N83-12327# Fraser (J. Kenneth) and Associates, Rensselaer, N.Y.
MODULAR SMALL HYDRO CONFIGURATION
Sep. 1981 195 p refs
(PB82-184953; ERDA-81-16; Rept-262/ET-RER/80) Avail: NTIS HC A09/MF A01 CSCL 17B

Smaller sites (those under 750 kilowatts) which previously were not attractive to develop using equipment intended for application at larger scale sites, were the focal point in the conception of a system which utilizes standard industrial components which are generally available within short procurement times. Such components were integrated into a development scheme for sites having 20 feet to 150 feet of head. The modular small hydro configuration maximizes the use of available components and minimizes modification of existing civil works. A key aspect of the development concept is the use of a vertical turbine multistage pump, used in the reverse mode as a hydraulic turbine. The configuration allows for automated operation and control of the hydroelectric facilities with sufficient flexibility for inclusion of potential hydroelectric sites into dispersed storage and generation (DSG) utility grid systems. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-12328# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE DESIGN OF TRANSITIONS IN WAVEGUIDES
Eduardo Antonio Parada Tude and Carlos Alberto Iennaco Miranda Apr. 1982 22 p refs In PORTUGUESE; ENGLISH summary
(INPE-2369-PRE/409) Avail: NTIS HC A02/MF A01

Waveguide circuits often employ transitions between the various waveguide types which are best adapted to each circuit block. The design of transitions between circular/rectangular and rectangular/rectangular waveguides is presented. The transitions were calculated by means of equivalent transmission line circuits, so as to obtain the condition of minimum VSWR. The circular/rectangular transition was also analyzed for its propagating modes, in order to prevent the excitation of modes others than the principal mode in the circular waveguide. The prototypes built amply confirm the method of calculation. The M-band circular/rectangular transition presented a maximum VSWR of 1.04 and the m-rectangular to p-rectangular transition, a maximum VSWR of 1.012. Author

N83-12329*# Dayton Univ., Ohio. School of Engineering.
TESTING OF THE PERMANENT MAGNET MATERIAL Mn-Al-C FOR POTENTIAL USE IN PROPULSION MOTORS FOR ELECTRIC VEHICLES
Z. A. Abdelnour, H. F. Mildrum, and K. J. Strnat 12 Nov. 1980 107 p refs
(Contract DEN3-189)
(NASA-CR-169481; NAS 1.26:169481) Avail: NTIS HC A06/MF A01 CSCL 09C

The development of Mn-Al-C permanent magnets is reviewed. The general properties of the material are discussed and put into perspective relative to alnicos and ferrites. The commercial material now available is described by the manufacturer's data. The traction motor designer's demands of a permanent magnet for potential use in electric vehicle drives are reviewed. From this, a list of the needed specific information is extracted. A plan for experimental work is made which would generate this information, or verify data supplied by the producer. The results of these measurements are presented in the form of tables and graphs. The tests determined magnetic design data and some mechanical strength properties. Easy axis hysteresis and demagnetization curves, recoil loops and other minor loop fields were measured over a temperature range from -50 C to +150 C. Hysteresis loops were also measured for three orthogonal directions (the easy and 2 hard axes of magnetization). S.L.

N83-12330*# Varian Associates, Palo Alto, Calif. Microwave Tube Div.
DESIGN CONCEPTS FOR A HIGH-IMPEDANCE NARROW-BAND 42 GHz POWER TWT USING A FUNDAMENTAL/FORWARD LADDER-BASED CIRCUIT Final Report
A. Karp Aug. 1980 79 p refs
(Contract NAS3-21930)
(NASA-CR-165282; NAS 1.26:165282; JO-19128) Avail: NTIS HC A05/MF A01 CSCL 09A

A low-cost, narrowband, millimeter wave space communications TWT design was studied. Cold test interaction structure scale models were investigated and analyses were undertaken to predict the electrical and thermal response of the hypothetical 200 W TWT at 42 GHz and 21 kV beam voltage. An intentionally narrow instantaneous bandwidth (1%, with the possibility of electronic tuning of the center frequency over several percent) was sought with a highly dispersive, high impedance 'forward wave' interaction structure based on a ladder (for economy in fabrication) and nonspace harmonic interaction, for a high gain rate and a short, economically focused tube. The 'TunneLadder' interaction structure devised combines ladder properties with accommodation for a pencil beam. Except for the impedance and bandwidth, there is much in common with the millimeter wave helix TWTs which provided the ideal of diamond support rods. The benefits of these are enhanced in the TunneLadder case because of spatial separation of beam interception and RF current heating. S.L.

N83-12331# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN ACTIVE FILTER CAPABLE OF REALIZING ANY STABLE TRANSFER FUNCTION [UM FILTRO ATIVO CAPAZ DE REALIZAR QUALQUER FUNCAO DE TRANSFERENCIA ESTAVEL]
Plinio Tissi Sep. 1982 12 p refs In PORTUGUESE; ENGLISH

summary
(INPE-2554-RPE/418) Avail: NTIS HC A02/MF A01

An active filter, used as a low pass filter, can realize a generic transfer function, after adders are included. The resulting filter is canonical, since it utilizes a number of capacitors that are equal to the degree of the function. S.L.

N83-12332*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RECIPROCATING LINEAR MOTOR Patent Application
Michael P. Goldowsky, inventor (to NASA) (North American Philips Corp., Tarrytown, N.Y.) Filed 29 Oct. 1982 18 p Sponsored by NASA
(NASA-Case-GSC-12773-1; US-Patent-Appl-SN-437914) Avail: NTIS HC A02/MF A01 CSCL 09A

A reciprocating linear motor is formed with a pair of ring-shaped permanent magnets having opposite radial polarizations, held axially apart by a nonmagnetic yoke, which serves as an axially displaceable armature assembly. A pair of annularly wound coils having axial lengths which differ from the axial lengths of the permanent magnets are serially coupled together in mutual opposition and positioned with an outer cylindrical core in axial symmetry about the armature assembly. One embodiment includes a second pair of annularly wound coils serially coupled together in mutual opposition and an inner cylindrical core positioned in axial symmetry inside the armature radially opposite to the first pair of coils. Application of a potential difference across a serial connection of the two pairs of coils creates a current flow perpendicular to the magnetic field created by the armature magnets, thereby causing limited linear displacement of the magnets relative to the coils. NASA

N83-12333*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
REACTANCELESS BANDPASS AMPLIFIER Patent Application
Leonard L. Kleinberg, inventor (to NASA) Filed 13 Oct. 1982 15 p
(NASA-Case-GSC-12788-1; US-Patent-Appl-SN-434085) Avail: NTIS HC A02/MF CSCL 09A

An active R bandpass filter network is formed by four operational amplifier stages interconnected by discrete resistances. One pair of stages synthesizes an equivalent input impedance of an inductance in parallel with a discrete resistance while the second pair of stages synthesizes an equivalent input impedance of a capacitance serially coupled to another discrete resistance coupled in parallel with the first two stages. The equivalent input impedances aggregately define a tuned resonant bandpass filter in the roll-off regions of the operational amplifiers. NASA

N83-12334*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SUBMILLIMETER WAVE SCHOTTKY BARRIER DIODE WITH LOW SERIES RESISTANCE AND LOW NOISE Patent Application
Richard J. Mattauch (JPL, California Inst. of Tech., Pasadena) Filed 29 Oct. 1982 19 p
(Contract NAS7-100)
(NASA-Case-NPO-15935-1; US-Patent-Appl-SN-437913) Avail: NTIS HC A02/MF A01 CSCL 09A

A Schottky barrier diode is described in which the series resistance and noise temperature characteristics of the device are decoupled by a thin epitaxial layer between a thick epitaxial layer and a metal anode. The thin epitaxial layer is suitably doped to provide an active barrier to quantum mechanical tunneling of electrons from a degenerately doped semiconductor substrate to the metal anode. The doping concentration of the thick epitaxial layer may be for the desired reverse breakdown characteristic, such as a high concentration level for low internal resistance and low reverse breakdown characteristic, and a low concentration level for high internal resistance and high reverse breakdown characteristic. In either case, the barrier layer prevents quantum mechanical tunneling, which is the cause of high device noise. NASA

N83-12335*# National Aeronautics and Space Administration. Pasadena Office, Calif.
CLOSED LOOP ELECTROSTATIC SYSTEM Patent Application
Won Kyu Rhim, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena), Melvin M. Saffren, and Daniel D. Elleman Filed 29 Oct. 1982 16 p
(Contract NAS7-100)
(NASA-Case-NPO-15553-1; US-Patent-Appl-SN-437912) Avail: NTIS HC A02/MF A01 CSCL 09C

An electrostatic levitation system is described, which can closely control the position of objects of appreciable size. A plurality of electrodes surround the desired position of an electrostatically charged object, the position of the object is monitored, and the voltages applied to the electrodes are varied to hold the object at a desired position. In one system, the object is suspended above a plate-like electrode which has a concave upper face to urge the object toward the vertical axis of the curved plate. An upper electrode that is also curved can be positioned above the object, to assure curvature of the field at any height above the lower plate. In another system, four spherical electrodes are positioned at the points of a tetrahedron, and the voltages applied to the electrodes are varied in accordance with the object position as detected by two sensors. NASA

N83-12336# Varian Associates, Beverly, Mass.
CONSTRUCTION, TEST AND DELIVERY OF STANDARDIZED COAXIAL MAGNETRON Final Report, 16 Jul. 1979 - 17 Apr. 1981
T. E. Ruden 23 Sep. 1981 162 p Sponsored in part by the Air Force
(Contracts N66001-79-C-0225; N00039-79-C-0150)
(AD-A118475; NOSC-CR-112) Avail: NTIS HC A08/MF A01 CSCL 09/1

A VMS-1104 coaxial magnetron was constructed and evaluated. The SPN-43 radar transmitter cabinet was modified to accept this tube; satisfactory operation of the tube and modification kit in an SPN-43 system was demonstrated at a Navy test facility. An additional VMS-1104 tube and spare vacuum insert was constructed, tested and delivered. Spurious signal from these tubes is -50 dB or better. A VMS-1054 coaxial magnetron was constructed and evaluated. Satisfactory RF performance was demonstrated. Spurious signal generation from this tube closely approximated -60 dB. Author (GRA)

N83-12337# Erie Technological Products of Canada Ltd., Trenton (Ontario).
MANUFACTURING METHODS AND TECHNIQUES FOR MINIATURE HIGH VOLTAGE HYBRID MULTIPLIER MODULES Quarterly Progress Report, 1 Oct. 1980 - 31 Dec. 1982
M. I. Matuszewski and K. I. Semy 31 Dec. 1982 44 p
(Contract DAAB07-76-C-0041)
(AD-A118783; QPR-11; QPR-12) Avail: NTIS HC A03/MF A01 CSCL 13/8

The assembly of a multiplier with a notched capacitor was evaluated. The thickness of the capacitor was maintained to ensure high breakdown voltage. Author (GRA)

N83-12338# Hughes Aircraft Co., Culver City, Calif.
RADC THERMAL GUIDE FOR RELIABILITY ENGINEERS Final Technical Report, 23 Dec. 1980 - 23 Jan. 1982
Gerald N. Morrison, James M. Kallis, Landon A. Strattan, Ivan R. Jones, and August L. Lena Griffiss AFB, N.Y. RADC Jun. 1982 134 p refs
(Contract F30602-81-C-0033; AF Proj. 2338)
(AD-A118839; HAC-FR-81-70-778; RADC-TR-82-172) Avail: NTIS HC A07/MF A01 CSCL 20/13

This guide was developed to provide a reliability engineer, who is not proficient in thermal design and analysis techniques, with the tools for managing and evaluating the thermal design and production of electronic equipment. It defines the requirements and tasks that should be addressed in system equipment specifications and statements of work, and describes how to evaluate performance. Author (GRA)

N83-12339# Frequency Electronics, Inc., New Hyde Park, N.Y.
HIGH PERFORMANCE CRYSTAL OSCILLATOR DEVELOPMENT Interim Report, 1 Oct. 1980 - 30 Apr. 1982
John Ho Griffiss AFB, N.Y. RADC Jul. 1982 56 p refs
(Contract F19628-80-C-0198; AF Proj. 4600)
(AD-A118764; RADC-TR-82-191) Avail: NTIS HC A04/MF A01 CSCL 09/1

This contract calls for design, development, fabrication, and test of a fast warm-up Crystal Oscillator operating at 5 MHz and 10.05+ MHz. This first status report indicates that from the test results of the oscillators developed so far, further reductions of inner oven and oscillator assembly MASS is required. In addition, an approved method of coupling heat into the crystal blank will be worked upon. In order to reduce mass, redesign of the electronic circuitry from discrete circuits to IC and Hybrid circuits is necessary. A new configuration is shown in the report. The key innovation of the design is to put the heater and temperature sensing devices on a ceramic disk of approximately 1-in. in diameter. A new hybrid approach will permit the fastest warm-up ovenized oscillator of its kind and will out-perform the present model in reliability and quality. Author (GRA)

N83-12340# Motorola, Inc., Scottsdale, Ariz. Tactical Secure Systems Dept.
VLSI ARRAY PROCESSOR R and D Status Report, 31 Mar. - 30 Jun. 1982
Ed. Greenwood 19 Jul. 1982 3 p
(Contract N00014-80-C-0693; DARPA Order 4001)
(AD-A118550) Avail: NTIS HC A02/MF A01 CSCL 09/2

The Arithmetic Processor Unit (APU) data base design check was completed. Minor design rule violations and design improvements were accomplished. The APU mask set has been fabricated and checked. Initial checking of all mask layers revealed a design rule problem in one layer. That layer was corrected, refabricated and checked out. The mask set has been delivered to the chip fabrication area. The fabrication process has been initiated. All work on the Array Processor Demonstration System (APDS) has been suspended at CHI until the additionally requested funding was received. That funding has been authorized and CHI will begin work on the APDS in July. The following activities are planned in the following quarter: 1) Complete fabrication of the first lot of VLSI APU devices. 2) Complete integration and check-out of the APDS simulator. 3) Complete integration and check-out of the APU breadboard. 4) Verify the VLSI APU wafer tests with the APU breadboard. 5) Complete check-out of the APDS using the APU breadboard. Author (GRA)

N83-12341# Honeywell, Inc., Hopkins, Minn. Defense Systems Div.
EVALUATION SELECTION OF ENCAPSULATING PLASTICS FOR ORDNANCE ELECTRONIC ASSEMBLIES Final Report, 8 Jan. 1979 - 30 Apr. 1980
Stephen J. Price, R. E. Isliefson, R. J. Ryan, and Allan Goldberg Adelphi, Md. HDL May 1981 125 p refs
(Contract DAAK21-79-C-0017; HDL Proj. 80178A)
(AD-A118714; HDL-CR-81-017-1; Rept-41735) Avail: NTIS HC A06/MF A01 CSCL 11/9

A program was conducted to evaluate new plastics for encapsulating ordnance electronic circuits. Various candidate plastics including foams, syntactic resins, filled systems, semirigids, elastomers and molded thermoplastics and thermosets were evaluated through extensive mechanical and environmental tests followed by encapsulation of test circuits. Additionally, a relative cost comparison of the various material categories was conducted to identify and quantify cost drivers. GRA

N83-12342# Sandia Labs., Albuquerque, N. Mex.
ELECTRICAL CONDUCTIVITY OF RIGID POLYURETHANE FOAM AT HIGH TEMPERATURE
Ralph T. Johnson, Jr. Aug. 1982 21 p ref
(Contract DE-AC04-76DP-00789)
(DE82-020468; SAND-82-1259) Avail: NTIS HC A02/MF A01

The electrical conductivity of rigid polyurethane foam, used for electronic encapsulation, was measured during thermal decomposition to 3400 C. At higher temperatures the conductance continues to increase. With pressure loaded electrical leads, sample softening results in eventual contact between electrodes which produces electrical shorting. Air and nitrogen environments show no significant dependence of the conductivity on the atmosphere over the temperature range. The insulating characteristics of polyurethane foam below approx. 2700 C are similar to those for silicone based materials used for electronic case housings and are better than those for phenolics. At higher temperatures (greater than or equal to 2700 C) the phenolics appear to be better insulators to approx. 5000 C and the silicones to approx. 6000 C. It is concluded that the Sylgard 184/GMB encapsulant is a significantly better insulator at high temperature than the rigid polyurethane foam. DOE

N83-12343# Bendix Corp., Kansas City, Mo.
COMPUTER-AIDED PROCESS PREPARATION FOR PRINTED WIRING BOARDS
K. D. Foreman Nov. 1981 22 p refs
(Contract DE-AC04-76DP-00613)
(DE82-004522; BDX-613-2707) Avail: NTIS HC A02/MF A01

A pilot computer project using CAD-CAM software, and a graphics terminal which intergrates design, process preparation, and manufactures printed wiring boards through automation is described. A CAD-CAM data base was used to compare critical design features to statistical process models to predict yield before production begins. The onscreen display of digital design definitions is shown to contribute to greater, more predictable and reliable yields for complex multilayer and double sided designs. It is indicated that use of computer graphics and CAD-CAM software to fabricate printed wiring boards increases accuracy of yield and reduces engineering time required for manual procedures. DOE

N83-12344# Los Alamos Scientific Lab., N. Mex.
SUPERCONDUCTING-TRANSMISSION-LINE PROJECT AT THE LOS ALAMOS NATIONAL LABORATORY Final Progress Report, 1 Oct. 1980 - 30 Sep. 1981
W. E. Keller, comp., J. A. Barclay, K. C. Lim, M. P. Maley, L. R. Newkirk, W. F. Stewart, J. D. Thompson, and F. A. Valencia Jul. 1982 38 p refs
(Contract W-7405-eng-36)
(DE82-021835; LA-9342-PR) Avail: NTIS HC A03/MF A01

Results are presented of experiments aimed at developing advanced, high-capacity, power transmission conductors using superconducting materials derived from Nb3Ge. Successful efforts for producing a model superconducting (Nb3Sn) joint for use in superconducting lines are described. Realistic theoretical calculations have been completed on the cooldown of a model ac transmission line designed by the Brookhaven National Laboratory program. DOE

N83-12345# National Bureau of Standards, Washington, D.C.
NBS 30/60 MEGAHERTZ NOISE MEASUREMENT SYSTEM OPERATION AND SERVICE MANUAL
George Counas and Tom Bremer Dec. 1981 181 p
(PB82-178989; NBSIR-81-1656) Avail: NTIS HC A09/MF A01 CSCL 14B

The general theory of operation, operating procedures, and maintenance procedures for an automated noise measurement system using a commercially available desktop calculator as the controller are described. Calibration of coaxial noise sources at 30 and 60 MHz using a total power radiometer designed to operate under computer control is described. Use of the IEEE 488 instrument bus and structured software techniques allows substitution of commercially available components with a minimum of hardware and software modification. Author (GRA)

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-12346# National Aerospace Lab., Tokyo (Japan).
AN EXPERIMENTAL AND ANALYTICAL STUDY ON SPRAY FLOW FIELD BY LIQUID/GAS COAXIAL INJECTOR ELEMENTS (I)
Nobuyuki Yatsuyanagi 1982 55 p refs In JAPANESE; ENGLISH summary
(NAL-TR-692; ISSN-0389-4010) Avail: NTIS HC A04/MF A01

The spray flow field formed by flush face concentric tube injector elements was investigated by nonreactive cold liquid gas flow test. An analytical model was derived to predict the spray flow field, including the local atomization rate of the liquid jet, the gas phase velocity decay, liquid mass flux dispersion and the local liquid droplets to gas mixing efficiencies. It was shown that the ratio of the half width of the liquid phase mass flux to that of the gas phase velocity is the critical factor in controlling the mixing efficiencies of the spray flow field; in addition, this critical factor is related to the ratio of the gas to liquid injection velocity. S.L.

N83-12347# National Aerospace Lab., Tokyo (Japan).
THE SPREADING RATE OF NONHOMOGENEOUS TURBULENT JETS
Hiroshi Ishigaki Feb. 1982 15 p refs In JAPANESE; ENGLISH summary
(NAL-TR-701; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Dimensional analysis suggests that the growth of the half width of a turbulent jet issuing into a quiescent fluid is independent of exit conditions, including nozzle geometry and density difference. The hypothesis is confirmed by an extensive survey of the experimental data. The empirical formulae of the half width of velocity, temperature, and concentration are given for round and plane jets. As an application the turbulent Prandtl and Schmidt numbers are obtained from the empirical formulae. Consideration is given to the limits of the results. Author

N83-12348# National Aerospace Lab., Tokyo (Japan).
NUMERICAL SIMULATION OF INVISCID COMPRESSIBLE FLOW THROUGH TWO-DIMENSIONAL CASCADE BY FINITE AREA METHOD
Masahiro Fukuda, Hideaki Nishimura, and Atsuhiro Tamura 1982 17 p refs In JAPANESE; ENGLISH summary
(NAL-TR-709; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

The steady inviscid compressible flow through the two dimensional cascade is computed by the method of time-dependent finite area with hexagonal integral domain. Three different equation systems are considered which are physically equivalent under two assumptions: (1) steady state, (2) subsonic, or (3) existing weak shock flow field. The basic system is composed of the continuity equation, the Euler equation, and the energy equation. Their differences during numerical behavior approaching the steady state are examined through computations. To prevent the pressure or the density from becoming negative, the spatial averaging for smoothing was used, which appears to have some artificial viscosity and damping factor for time-dependent computations. In the steady state computed airfoil pressure distributions show good agreement with experimental measurements and there were few differences among the three equation systems. Author

N83-12349# Cambridge Univ. (England). Dept. of Engineering.
CRITICAL CONDITIONS AND THE CHOKING MASS FLOWRATE IN NON-EQUILIBRIUM WET STEAM FLOWS
J. B. Young 1982 48 p refs
(CUED/A-Turbo/Tr-113; ISSN-0309-6521) Avail: NTIS HC A03/MF A01

Choking in steady, one dimensional, nonequilibrium, wet steam flows is analyzed. It is shown that the most useful, and physically informative, definition of the critical condition is that condition when the vapor phase velocity is equal to the frozen speed of sound. One dimensional wet steam flows become choked when the critical velocity is attained somewhere in the system. In this context the term choking implies that the upstream flow pattern cannot be altered by small adjustments of the back pressure and the mass flowrate is close to, although not necessarily identical with, its maximum value. The equilibrium speed of sound has no physical relevance in such flows. The critical conditions in a choked converging nozzle exhausting to a region of constant static pressure always occur in the exit plane of the nozzle. The analysis demonstrates that the critical pressure and velocity and the choking mass flowrate are all functions of the critical supercooling and inlet stagnation conditions only and shows how they may be calculated. S.L.

N83-12350# Cambridge Univ. (England). Dept. of Engineering.
NON-EQUILIBRIUM THROUGHFLOW ANALYSES OF LOW PRESSURE, WET STEAM TURBINES
C. C. Yeoh and J. B. Young 1982 44 p refs
(CUED/A-Turbo/TR-116; ISSN-0309-6521) Avail: NTIS HC A03/MF A01

A throughflow computational method is described which combines wet steam theory with an axisymmetric streamline curvature technique in order to predict nonequilibrium effects in low pressure steam turbines. The computer program developed is able to deal with both subsonic and fully choked supersonic flows and steam properties are represented by a truncated virial equation of state. A number of theoretical test cases were investigated, including the nonequilibrium flow in the primary nucleating stage of a low pressure turbine, the effect of droplet size on last stage performance, and the complete analysis of a six stage 320 MW operational turbine. The calculations are able to provide information on the spanwise variation of the Wilson point, the average droplet size nucleated, the degree of supercooling throughout the flowfield, the thermodynamic wetness loss and the nonequilibrium choking mass flowrate, in addition to the aerodynamic parameters which are of interest to the designer. M.G.

N83-12351# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DETERMINATION OF CONDUCTIVE THERMAL RESISTANCE OF PLATES WITH NONUNIFORM INTERNAL HEAT GENERATION AND UNDER VARIOUS BOUNDARY CONDITIONS
Olavo Bueno deOliveira Filho, Santiago Alves Tavares, and Nellore S. Venkataraman Aug. 1982 23 p refs Presented at the 1st Latin Am. Congr. on Heat and Mass Transfer, La Plata, 1982
(INPE-2512-PRE/191) Avail: NTIS HC A02/MF A01

The conductive resistance of thin rectangular plates with internal heat generation in two regions, with one end subject to an internal flux, is determined using the finite element method. The dependance of the thermal resistance on various parameters is discussed. A comparison is made with the one dimensional resistance. Author

N83-12352*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE CMC:3DPNS COMPUTER PROGRAM FOR PREDICTION OF THREE-DIMENSIONAL, SUBSONIC, TURBULENT AERODYNAMIC JUNCTURE REGION FLOW. VOLUME 1: THEORETICAL Final Report
A. J. Baker Washington NASA Nov. 1982 59 p refs
(Contract NAS1-15105)
(NASA-CR-3645; NAS 1.26:3645; COMCO-81TR-2.1) Avail: NTIS HC A04/MF A01 CSCL 20D

An order-of-magnitude analysis of the subsonic three dimensional steady time averaged Navier-Stokes equations, for semi-bounded aerodynamic juncture geometries, yields the parabolic Navier-Stokes simplification. The numerical solution of the resultant pressure Poisson equation is cast into complementary and particular parts, yielding an iterative interaction algorithm with an exterior three dimensional potential flow solution. A parabolic

transverse momentum equation set is constructed, wherein robust enforcement of first order continuity effects is accomplished using a penalty differential constraint concept within a finite element solution algorithm. A Reynolds stress constitutive equation, with low turbulence Reynolds number wall functions, is employed for closure, using parabolic forms of the two-equation turbulent kinetic energy-dissipation equation system. Numerical results document accuracy, convergence, and utility of the developed finite element algorithm, and the CMC:3DPNS computer code applied to an idealized wing-body juncture region. Additional results document accuracy aspects of the algorithm turbulence closure model. Author

N83-12353*# United Technologies Research Center, East Hartford, Conn.

ANALYTICAL MODELING OF OPERATING CHARACTERISTICS OF PREMIXING-PREVAPORIZING FUEL-AIR MIXING PASSAGES. VOLUME 1: ANALYSIS AND RESULTS Final Report

Olof L. Anderson, Louis M. Chiappetta, David E. Edwards, and John B. McVey 1982 145 p refs 2 Vol.

(Contract NAS3-21269)

(NASA-CR-167990-Vol-1; NAS 1.26:167990-Vol-1; R82-915362-40-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 20D

A model for predicting the distribution of liquid fuel droplets and fuel vapor in premixing-prevaporizing fuel-air mixing passages of the direct injection type is reported. This model consists of three computer programs; a calculation of the two dimensional or axisymmetric air flow field neglecting the effects of fuel; a calculation of the three dimensional fuel droplet trajectories and evaporation rates in a known, moving air flow; a calculation of fuel vapor diffusing into a moving three dimensional air flow with source terms dependent on the droplet evaporation rates. The fuel droplets are treated as individual particle classes each satisfying Newton's law, a heat transfer, and a mass transfer equation. This fuel droplet model treats multicomponent fuels and incorporates the physics required for the treatment of elastic droplet collisions, droplet shattering, droplet coalescence and droplet wall interactions. The vapor diffusion calculation treats three dimensional, gas phase, turbulent diffusion processes. The analysis includes a model for the autoignition of the fuel air mixture based upon the rate of formation of an important intermediate chemical species during the preignition period. S.L.

N83-12354*# United Technologies Research Center, East Hartford, Conn.

ANALYTICAL MODELING OF OPERATING CHARACTERISTICS OF PREMIXING-PREVAPORIZING FUEL-AIR MIXING PASSAGES. VOLUME 2: USER'S MANUAL

Olof L. Anderson, Louis M. Chiappetta, David E. Edwards, and John B. McVey Feb. 1982 158 p refs 2 Vol.

(Contract NAS3-21269)

(NASA-CR-167990-Vol-2; NAS 1.26:167990-V0l-2; R82-915362-40-Vol-2) Avail: NTIS HC A08/MF A01 CSCL 20D

A user's manual describing the operation of three computer codes (ADD code, PTRAK code, and VAPDIF code) is presented. The general features of the computer codes, the input/output formats, run streams, and sample input cases are described. S.L.

N83-12355*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.

ON HIGHER EIGENSTATES OF GOERTLER INSTABILITY IN COMPRESSIBLE FLOW Final Report for period ending 31 Aug. 1982

G. L. Goglia and Alok K. Verma Sep. 1982 27 p refs

(Grant NAG1-228)

(NASA-CR-169480; NAS 1.26:169480) Avail: NTIS HC A03/MF A01 CSCL 20D

The effect of secondary instabilities of Goertler vortices with respect to their growth and amplification was investigated. Instability of viscous flow along a concave surface is in the form of counterrotating streamwise vortices commonly known as Goertler vortices. The effects of suction on higher modes of Goertler vortices are also considered. J.D.

N83-12356*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

INTEGRATED FINITE ELEMENT THERMAL-STRUCTURAL ANALYSIS WITH RADIATION HEAT TRANSFER

Earl A. Thornton (Old Dominion Univ.), Pramote Dechaumphai (Old Dominion Univ.), and Allan R. Wieting Sep. 1982 11 p refs Presented at the 23rd AIAA/ASME/ASCE/AHS Structures, Structural Dyn. and Mater. Conf., New Orleans, 10-12 May 1982 Original document was announced as A82-30095

(NASA-TM-84469; NAS 1.15:84469) Avail: NTIS HC A02/MF A01 CSCL 20D

For abstract see A82-30095.

N83-12357*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TURBULENT SOLUTION OF THE NAVIER-STOKES EQUATIONS FOR AN INHOMOGENOUS DEVELOPING SHEAR LAYER

R. G. Deissler 1982 14 p refs Presented at the Am. Phys. Soc. Meeting on Fluid Dynamics, New Brunswick, N.J., 21-23 Nov. 1982

(NASA-TM-82969; E-1339; NAS 1.15:82969) Avail: NTIS HC A02/MF A01 CSCL 20D

To study the nonlinear physics of inhomogeneous turbulent shear flow, the unaveraged Navier-Stokes equations are solved numerically. For initial conditions a three-dimensional cosine velocity fluctuation and a mean-velocity profile with a step are used. Although the initial conditions are nonrandom. The flow soon becomes turbulent. Concentrated turbulent energy develops near the plane where the mean velocity gradient is initially infinite. The terms in the one-point correlation equation for turbulent energy, including those for the diffusion and production of turbulence, are calculated, the diffusion terms tend to make the turbulence more homogeneous. Author

N83-12358*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

NUMERICAL SIMULATION OF THE FLOW AND FUEL-AIR MIXING IN AN AXISYMMETRIC PISTON-CYLINDER ARRANGEMENT

Tom I-P. Shih, Gene E. Smith (Michigan Univ, Ann Arbor), and George S. Springer (Michigan Univ., Ann Arbor) 1982 25 p refs (NASA-TM-83011; E-1446; NAS 1.15:83011) Avail: NTIS HC A02/MF A01 CSCL 20D

The implicit factored method of Beam and Warming was employed to describe the flow and the fuel-air mixing in an axisymmetric piston-cylinder configuration during the intake and compression strokes. The governing equations were established on the basis of laminar flow. The increased mixing due to turbulence was simulated by appropriately chosen effective transport properties. Calculations were performed for single-component gases and for two-component gases and for two-component gas mixtures. The flow field was calculated as functions of time and position for different geometries, piston speeds, intake-charge-to-residual-gas-pressure ratios, and species mass fractions of the intake charge. Results are presented in graphical form which show the formation, growth, and break-up of those vortices which form during the intake stroke and the mixing of fuel and air throughout the intake and compression strokes. It is shown that at bore-to-stroke ratio of less than unity, the vortices may break-up during the intake stroke. It is also shown that vortices which do not break-up during the intake stroke coalesce during the compression stroke. The results generated were compared to existing numerical solutions and to available experimental data. Author

N83-12359*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

COMPUTER PROGRAM FOR A FOUR-CYLINDER-STIRLING-ENGINE CONTROLS SIMULATION Final Report

Carl J. Daniels and Carl F. Lorenzo Jun. 1982 83 p refs

(Contract DE-AI01-77CS-51040)

(NASA-TM-82774; E-1103; DOE/NASA-51040-37; NAS 1.15:82774) Avail: NTIS HC A05/MF A01 CSCL 09B

A four cylinder Stirling engine, transient engine simulation

computer program is presented. The program is intended for controls analysis. The associated engine model was simplified to shorten computer calculation time. The model includes engine mechanical drive dynamics and vehicle load effects. The computer program also includes subroutines that allow: (1) acceleration of the engine by addition of hydrogen to the system, and (2) braking of the engine by short circuiting of the working spaces. Subroutines to calculate degraded engine performance (e.g., due to piston ring and piston rod leakage) are provided. Input data required to run the program are described and flow charts are provided. The program is modular to allow easy modification of individual routines. Exampls of steady state and transient results are presented. S.L.

N83-12360*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FILM-COOLING EFFECTIVENESS WITH DEVELOPING COOLANT FLOW THROUGH STRAIGHT AND CURVED TUBULAR PASSAGES
S. Stephen Papell, Chi R. Wang, and Robert W. Graham Nov. 1982 21 p refs
(NASA-TP-2062; E-1206; NAS 1.60:2062) Avail: NTIS HC A02/MF A01 CSCL 20D

The data were obtained with an apparatus designed to determine the influence of tubular coolant passage curvature on film-cooling performance while simulating the developing flow entrance conditions more representative of cooled turbine blade. Data comparisons were made between straight and curved single tubular passages embedded in the wall and discharging at 30 deg angle in line with the tunnel flow. The results showed an influence of curvature on film-cooling effectiveness that was inversely proportional to the blowing rate. At the lowest blowing rate of 0.18, curvature increased the effectiveness of film cooling by 35 percent; but at a blowing rate of 0.76, the improvement was only 10 percent. In addition, the increase in film-cooling area coverage ranged from 100 percent down to 25 percent over the same blowing rates. A data trend reversal at a blowing rate of 1.5 showed the straight tubular passage's film-cooling effectiveness to be 20 percent greater than that of the curved passage with about 80 percent more area coverage. An analysis of turbulence intensity detain the mixing layer in terms of the position of the mixing interface relative to the wall supported the concept that passage curvature tends to reduce the diffusion of the coolant jet into the main stream at blowing rates below about. Explanations for the film-cooling performance of both test sections were made in terms differences in turbulences structure and in secondary flow patterns within the coolant jets as influenced by flow passage geometry. Author

N83-12361*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THERMAL CONTROL SYSTEM Patent Application
Dennis R. Hewitt, inventor (to NASA) Filed 15 Oct. 1982 20 p (NASA-Case-GSC-12771-1; US-Patent-Appl-SN-434672) Avail: NTIS HC A02/MF A01 CSCL 20D

A variable, thermal control system for regulating the temperature of an exothermic process plant carried aboard an Earth orbiting spacecraft is made with a plurality of curved radiator panels arcuately positioned in a circular arrangement to form an open receptacle. A module containing the process is insertable into the receptacle. Heat exchangers having broad exterior surfaces extending axially above the circumference of the module fit within arcuate spacings between adjacent radiator panels. Banks of variable conductance heat pipes partially embedded within and thermally coupled to the radiator panels extend across the arcuate spacings and are thermally coupled to broad exterior surfaces of the heat exchangers by flanges. Temperature sensors monitor the temperature of process fluid flowing from the module through the heat exchangers. Thermal conduction between the heat exchangers and the radiator panels is regulated by heating a control fluid within the heat pipes to vary the effective thermal length of the heat pipes in inverse proportion to changes in the temperature of the process fluid. NASA

N83-12362# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
SEPARATED FLOWS IN TURBOMACHINERY COMPONENTS, VOLUME 2
1981 348 p refs Lecture series held at Rhode-Saint-Genese, Belgium, 12-16 Jan. 1981
(VKI-LS-1981-1-Vol-2) Avail: NTIS HC A15/MF A01

Methods for computation of turbulent and compressible boundary layers are presented. For individual titles, see N83-12363 through N83-12364.

N83-12363# National Technical Univ., Athens (Greece).
LE FOLL'S METHOD AND THE CALCULATION OF ATTACHED AND SEPARATED TWO DIMENSIONAL BOUNDARY LAYERS
K. D. Papailiou *In* Von Karman Inst. for Fluid Dynamics Separated Flows in Turbomachinery Components, Vol. 2 1981 104 p refs (For primary document see N83-12362 03-34)
Avail: NTIS HC A15/MF A01

The application of the Le Foll method to two dimensional (converging-diverging or axially symmetric) laminar or turbulent compressible attached or separated boundary layers is described. The prediction of such layers and their general behavior are described. As the applications discussed are mainly in the field of turbomachinery, effects on turbulence like the ones produced by the presence of curved walls or Coriolis forces are included. J.D.

N83-12364# Centre d'Etudes et de Recherches, Toulouse (France). Dept. d'Aerothermodynamique.
TURBULENCE MODELLING AND BOUNDARY LAYER CALCULATION METHODS
J. Cousteix *In* Von Karman Inst. for Fluid Dynamics Separated Flows in Turbomachinery Components, Vol. 2 1981 134 p (For primary document see N83-12362 03-34)
Avail: NTIS HC A15/MF A01

Turbulent boundary layer prediction methods which lend themselves to working with a great variety of parameters are surveyed. The underlying applications are flows in turbomachine where nearly all imaginable complications are present. The most ambitious methods include transport equations for the Reynolds stress tensor, and at least one equation for a characteristic length. A simpler technique is the eddy viscosity concept which can often be derived from the Reynolds stress tensor equations. Even simpler are the integral methods which solve a set of boundary layer equations integrated from the wall to the edge of the boundary layer. To establish the needed closure relationships, the properties of theoretical self-similar solutions were investigated. Closure of Reynolds stress tensor transpot equations in the general case of a three dimensional time dependent flow and closure relationships of integral equations in the case of a two dimensional steady flow are described in detail. J.D.

N83-12365# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
NUMERICAL COMPUTATION OF MULTI-PHASE FLOWS
1981 333 p refs Lecture series held at Rhode-Saint-Genese, Belgium, 26-30 Jan. 1981
(VKI-LS-1981-2) Avail: NTIS HC A15/MF A01

The computer prediction of flows in which several phases move with differing velocities within the same space is discussed. For individual titles, see N83-12366 through N83-12371.

N83-12366# Imperial Coll. of Science and Technology, London (England).
NUMERICAL COMPUTATION OF MULTI-PHASE FLOWS: A COURSE OF TWELVE LECTURES AND COMPUTER WORKSHOPS
D. Brian Spalding *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 1-118 refs (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

Practical problems involving multi-phase flow phenomena are reviewed, and the desirability of employing numerical methods for their quantitative prediction is emphasized. A particular method of

solving the relevant equations is described; and examples of its use are illustrated and discussed. Problems involving both steady and unsteady flow are considered, in one, two and three space dimensions, and both with and without interphase heat and mass transport. The computation procedure was embodied in a computer program, GENMIX 2P, which permits the solution of two dimensional, two phase, parabolic problems. This program is described. Author

N83-12367# Imperial Coll. of Science and Technology, London (England).
NUMERICAL COMPUTATION OF MULTI-PHASE FLUID FLOW AND HEAT TRANSFER
D. Brian Spalding *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 161-191 refs Prepared in cooperation with Purdue Univ., Lafayette, Ind. (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

The (IPSA) inter-phase-slip algorithm numerical procedure for solving the equations of heat, mass and momentum transfer governing multi-phase flow phenomena is described. The procedure is an iterative one, operating on finite-difference equations connecting the values of variables pertaining to points arrayed on a staggered topologically cartesian grid. The IPSA procedure can handle one, two and three dimensional distributions of the variables in space; both steady and transient processes can be handled; the fluids may be compressible or incompressible; buoyancy, phase-change and chemical reaction effects may be present; and a special version of IPSA is available which facilitates the handling of gravity-stratified flows. Author

N83-12368# Purdue Univ., Lafayette, Ind. Thermal Science and Propulsion Center.
ONE-DIMENSIONAL UNSTEADY TWO-PHASE FLOWS WITH INTERPHASE SLIP: A NUMERICAL STUDY
Y. Kursaki (Tokyo Inst. of Tech.) and D. Brian Spalding (Imperial Coll. of Science and Technology) *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 193-217 refs Also presented at the 2d Multi-Phase Flow and Heat Transfer Symp.-Workshop, Miami Beach, Fla., Apr. 1979 (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

A demonstration is made of the application of the IPSA algorithm to the numerical computation of the unsteady motion of two fluids contained in a single duct. Both fluids are incompressible; and both the dispersed and gravity-stratified configurations are considered. It is shown that the finite-difference versions of the differential equations are easily soluble, where comparisons can be made, computations made with sufficiently fine grids are accurate, elsewhere, the solutions are always plausible, and the major source of inaccuracy is false diffusion. Author

N83-12369# Imperial Coll. of Science and Technology, London (England).
MATHEMATICAL METHODS IN NUCLEAR-REACTOR THERMAL HYDRAULICS
D. Brian Spalding *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 219-262 refs Also presented at the Meeting on Nucl.-Reactor Hydraulics, Saratoga, N.Y., 6 Oct. 1980; sponsored by American Nuclear Society (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

A review is made of the mathematical problem predicting the flow of interspersed phases, possessing differing (average) velocities at the same instant and location, and of successful methods of solving the problem. It is argued that, the mathematical difficulties having now been overcome, further attention should be devoted, on the computational side, to faster algorithms and more flexible computer codes; and, on the physical side, to the development of models for interfacial area, interphase transport, and interactions with solid structural elements. Author

N83-12370# Imperial Coll. of Science and Technology, London (England).
DEVELOPMENTS IN THE PROCEDURE FOR NUMERICAL COMPUTATION OF MULTI-PHASE-FLOW PHENOMENA WITH INTER-PHASE SLIP, UNEQUAL TEMPERATURES, ET CETERA
D. Brian Spalding *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 263-284 (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

Developments in and additions to the inter-phase-slip algorithm, IPSA are reviewed. A fully symmetrical volume-fraction equation was adopted. The treatment of stratified-flow and particle-packing problems was unified. A donor-acceptor version was developed. Applications with interphase heat and mass transfer were successfully made. A simple technique for the approximate calculation of the mass-transfer-influenced particle-size distribution was devised. Preliminary thought was given to the incorporation of turbulent mixing, based on new hypotheses. Author

N83-12371# Imperial Coll. of Science and Technology, London (England).
THE PREDICTION OF STEADY, THREE-DIMENSIONAL FLOW IN PRESSURIZED WATER-STREAM GENERATORS
G. Hulme, P. J. Phelps, D. Brian Spalding, and D. G. Tatchell (CHAM Ltd., London) *In* Von Karman Inst. for Fluid Dyn. Numerical Computation of Multi-Phase Flows 1981 p 285-292 refs (For primary document see N83-12365 03-34)
Avail: NTIS HC A15/MF A01

A calculation procedure is described for three dimensional flow and heat transfer in stea generators. Options are provided to calculate slip between the phases, and to treat the flow as homogeneous (i.e., phase velocities equal). Typical homogeneous-flow results are shown for a steam generator of the type used in pressurized-water reactors. The predicted effect of removing the flow-distribution plate is illustrated. These results, and others reported elsewhere, show that practical, three dimensional predictions of steam generator flow phenomena can now be made. These can be utilised by designers and operators to: improve performance at the design stage by, for example, examining effects of flow distributing devices on performance; analyze the effects of changes in operating conditions, or deterioration, which occur during use; or, examine the causes of failure in use, and the effectiveness of proposed cures. Author

N83-12372# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
COMPUTATIONAL FLUID DYNAMICS
1981 578 p refs Lecture Series held at Rhode-Saint-Genese, Belgium, 30 Mar. - 3 Apr. 1981
(VKI-LS-1981-5) Avail: NTIS HC A25/MF A01

Advances in the theory and application of numerical methods for the solution of problems in two and three dimensions with complex boundaries, and for the simulation of turbulent flows are considered. For individual titles, see N83-12373 through N83-12379.

N83-12373*# Stanford Univ., Calif. Thermosciences Div.
HIGHER LEVEL SIMULATIONS OF TURBULENT FLOWS
J. H. Ferziger *In* Von Karman Inst. for Fluid Dynamics Computational Fluid Dyn. 1981 148 p refs Document also announced as N82-11395 (For primary document see N83-12372 03-34)
(Grants NAG2-15; NSF ENG-78-17619)
(SU-TF-16) Avail: NTIS HC A25/MF A01

The fundamentals of large eddy simulation are considered and various approaches to this simulation are compared. The subgrid model required by large eddy simulation is discussed as well as the use of this type of simulation in the development of models for the Reynolds-averaged equations and the application of direct simulation to the testing of both subgrid scale and Reynolds-averaged models. Numerical methods used in large eddy and direct simulation are described with emphasis on special purpose methods. Topics covered include the simulation of homogeneous flow, free shear flows, the mixing layer, wakes, and wall-bounded

flows including channel flow and the boundary layer. Applications of large eddy simulation in the laboratory as in meteorological and other environmental flows are examined. Directions in which the work is proceeding and what can be expected from higher levels simulated on are examined. A.R.H.

N83-12374# Ruhr Univ., Bochum (West Germany).
INTRODUCTION TO MULTI-GRID METHODS FOR THE NUMERICAL SOLUTION OF BOUNDARY VALUE PROBLEMS
W. Hackbusch *In* Von Karman Inst. for Fluid Dynamics Computation Fluid Dyn. 1981 54 p refs (For primary document see N83-12372 03-34)
Avail: NTIS HC A25/MF A01

Examples of various boundary problems are given and difference schemes and finite element methods for solving such problems are described. Topics covered include: (1) linear two-grid method; (2) linear multi-grid method; (3) smoothing techniques; (4) numerical results; (5) nested iteration; (6) further modifications; (7) nonlinear multigrid literation; (8) nonlinear example: Convection in an enclosed cavity; (9) Stokes' problem and steady Navier-Stokes equations; (10) elliptic eigenvalue problems; and (11) multi-grid method of the second king. A.R.H.

N83-12375# Ghent Univ. (Belgium).
RELAXATION METHODS FOR STEADY TRANSONIC FLOW CALCULATIONS BY EULER EQUATIONS
E. Dick *In* Von Karman Inst. for Fluid Dynamics Computation Fluid Dyn. 1981 89 p refs (For primary document see N83-12372 03-34)
Avail: NTIS HC A25/MF A01

Transonic potential equations are mixed elliptical-hyperbolic, but Euler equations are mixed hyperbolic. Classic relaxation methods cannot be used for the hyperbolic equation. The natural techniques for solving the discretized equations corresponding to hyperbolic equations is marching in one of the hyperbolic directions. Since Euler equations are hyperbolic with respect to time, the obvious marching direction is the time direction. Time marching schemes have at best a convergence rate that is one order of magnitude lower than relaxation methods. An extension of relaxation schemes to hyperbolic equations allows the construction of algorithms for Euler equations which have the same convergence rates as the relaxation schemes for the potential equation. A.R.H.

N83-12376# Cincinnati Univ., Ohio.
NOTES ON COORDINATE GENERATION: FUNDAMENTAL IDEAS
R. T. Davis *In* Von Karman Inst. for Fluid Dynamics Computational Fluid Dyn. 1981 28 p refs (For primary document see N83-12372 03-34)
Avail: NTIS HC A25/MF A01

Optimal coordinates, undoubtedly of great use in analytical and numerical studies of boundary layers, are the coordinates in which the boundary-layer solution contains the proper behavior far from the body to produce the proper inviscid outer flow. How these coordinates can be calculated with the first-order boundary layer equations to produce, not only the proper first-order inviscid flow, but also the second-order outer flow resulting due to displacement thickness effects is reviewed and the ideas are extended to higher order. A.R.H.

N83-12377# Cincinnati Univ., Ohio. Dept. of Aerospace Engineering and Applied Mechanics.
NOTES ON NUMERICAL METHODS FOR COORDINATE GENERATION BASED ON A MAPPING TECHNIQUE
R. T. Davis *In* Von Karman Inst. for Fluid Dynamics Computational Fluid Dyn. 1981 85 p refs (For primary document see N83-12372 03-34)
(Contract N00014-76-C-0364)
Avail: NTIS HC A25/MF A01

A coordinate generation method for use in computational fluid dynamics problems is developed which is much simpler, more accurate, and more flexible than currently existing methods. This approach is based on numerical integration of Schwarz-Christoffel transformations for general curved surfaces. It is shown to be second-order accurate in mesh size with extensions to higher-order accuracy levels identified. In addition, this method directly provides the two dimensional incompressible potential flow solution for flow past complex body shapes including flows with free streamlines. Example symmetric cases are given for flow past a hexagon, a six point cross, a NACA airfoil, and free streamline flow past a circular cylinder. Finally, the method is extended to more general cases and, in particular, to flows with circulation and channel flows. Author

N83-12378# Imperial Coll. of Science and Technology, London (England). Dept. of Mechanical Engineering.
NUMERICAL METHODS FOR TWO- AND THREE-DIMENSIONAL VISCOUS FLOWS
R. I. Issa *In* Von Karman Inst. of Fluid Dynamics Computational Fluid Dyn. 1981 33 p refs (For primary document see N83-12372 03-34)
Avail: NTIS HC A25/MF A01

An overview of the main options available for the application of finite-difference methods to two- and three-dimensional recirculating flows, eitner laminar or turbulent is presented with attention focused on the alternative paths that can be chosen for the solution of the discretized Navier-Stokes equations. The merits of basin methods on the use of density as a main dependent variable in preference to the pressure are examined and techniques based on the use of the pressure are discussed, within the context of practicability and generality of application to engineering problems. Where possible, recommendation of certain choices are made. Sample calculations carried out for a variety of two- and three-dimensional flows are presented. A.R.H.

N83-12379# Aircraft Research Association Ltd., Bedford (England).
THE COMPUTATION OF TRANSONIC POTENTIAL FLOW
Timothy J. Baker *In* Von Karman Inst. for Fluid Dynamics Computational Fluid Dyn. 1981 128 p refs (For primary document see N83-12372 03-34)
Avail: NTIS HC A25/MF A01

Currently available methods for computing steady, inviscid, potential flow by finite difference techniques are discussed with emphasis on discretization of the potential equation, the use of iterative algorithms, and grid generation. Applications considered include axisymmetric solid bodies, axisymmetric nacelles, nozzles and ducts, and wing-body combinations. A.R.H.

N83-12380# University of Southern California, Los Angeles.
THE TRANSITON AND DYNAMICS OF BOUNDED AND FREE SHEAR LAYERS Dept. of Aerospace Engineering.
John Laufer, Richard Kaplan, and Chih-Ming Ho Mar. 1982 27 p refs
(Contract F49620-78-C-0060; AF Proj. 2307)
(AD-A118665; AFOSR-82-0652TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

Research activities in transitional and turbulent boundary layers and free shear flows are described. Experimental efforts which focused on an understanding of turbulent 'spots' in a developing laminar boundary layer flow, the development of conditional sampling technique for high response anemometry data, studies of spanwise streaks in the near wall region of a turbulent boundary layer and the dynamics of free and impinging jet flows are described. Analytical studies of the nonlinear stability of plane stagnation flows are also discussed. GRA

N83-12381# Wisconsin Univ., Madison. Mathematics Research Center.
STEWARTSON'S TRIPLE DECK
R. E. Meyer Jun. 1982 57 p refs
(Contracts DAAG29-80-C-0041; NSF MCS-80-01960)
(AD-A118617; MRC-TSR-2391) Avail: NTIS HC A04/MF A01 CSCL 20/4

An introduction to triple-deck theory for steady, two dimensional boundary layers in low-speed flow is presented. It aims to clarify

how the rational structure of the theory can rest on few premises and to make its new ideas and challenges more widely accessible. Author (GRA)

N83-12382# Defence Research Establishment, Ottawa. (Ontario). Environmental Protection Section.

MEASUREMENT OF THE COMBINED HEAT AND WATER-VAPOUR FLOW THROUGH CLOTHING UNDER TRANSIENT CONDITIONS

Brian Farnworth and Bjarne Nordli Mar. 1982 27 p refs
(AD-A118804; DREO-TN-82-13) Avail: NTIS HC A03/MF A01 CSCL 15/5

A sweating hot plate for the study of combined heat and water-vapor flow through clothing under Transient conditions is described. The results are in good agreement with the mathematical model reported in a previous paper for several model clothing systems. The heat loss through wool clothing was found to be smaller than that through similar polyester clothing during periods of sweating and larger during subsequent periods of drying, because of the effects of absorption of water vapor by hygroscopic materials. A comparison was made of the heat and vapor transmission of the clothing systems by incorporating a vapor-impermeable fabric or the waterproof but vapor-permeable fabric Gore-TEx. Liquid water was observed to condence on the inner surface of both fabrics during periods of sweating but the Gore-TEx dried within a few minutes of the end of the sweating period. Gore-TEx was found to be vapor permeable even at temperatures below 0 degrees C when frost was forming on its inner surface. Author (GRA)

N83-12383# South Carolina Univ., Columbia. Coll. of Engineering.

UNSTEADY BOUNDARY LAYER DUE TO AN OSCILLATING FREE STREAM VS. AN OSCILLATING MODEL Final Report, 15 May 1980 - 14 May 1981

Dennis E. Wilson 25 Jun. 1982 59 p refs
(Grant AF-AFOSR-0182-80; AF Proj. 2307)
(AD-A118591; AFOSR-82-0675TR) Avail: NTIS HC A04/MF A01 CSCL 20/4

The objective of this investigation is to calculate the unsteady boundary layer induced on a thin airfoil by two distinct mechanisms. First, a uniform upstream flow approaches an airfoil which is undergoing a periodic transverse oscillation of specified frequency and amplitude with respect to the wind tunnel. And secondly, a uniform upstream flow approaches the same airfoil which is fixed with respect to the wind tunnel but is now subjected to transverse oscillating flow. The transverse flow is produced at the walls of the wind tunnel test section and will contain a spatial distribution at the test section centerline. The method employed in this analysis uses the classical potential flow/boundary layer interaction. The mathematical model assumes a laminar incompressible flow over a two-dimensional thin airfoil. In addition, the amplitude of the transverse oscillation is assumed to be small with respect to the chord of the airfoil. This restriction is also equivalent to small transverse velocities relative to the upstream flow, if the frequencies are moderate. This assumption produces a set of linear disturbance equations for the unsteady flow. No other restrictions are placed upon the spatial distribution of the transverse flow, although results are presented only for cosine distribution which represents the worst possible case. Author (GRA)

N83-12384# Toronto Univ. (Ontario). Inst. for Aerospace Studies.

AEROPHYSICAL ASPECTS OF GAS AND PLASMA FLOWS Final Technical Report, 1 Apr. 1977 - 31 Jan. 1982

I. I. Glass 31 Mar. 1982 27 p refs
(Grant AF-AFOSR-3303-77; AF Proj. 2307)
(AD-A118586; AFOSR-82-0639TR) Avail: NTIS HC A03/MF A01 CSCL 20/9

Experimental and analytical investigations have been made of pseudo-stationary oblique shock wave reflections in monatomic, diatomic, triatomic and polyatomic gases. A method using explosive-driven implosions has been shown to provide a simple means of studying fusion plasmas at extreme temperatures and pressures. Analyses have been made of the dynamics of dusty gas flows produced by shock waves. Extensions of the random choice method have allowed accurate analysis of several types of flows with strong shock waves. Author (GRA)

N83-12385# California Univ., Berkeley. Dept. of Mechanical Engineering.

APPLICATIONS OF RAYLEIGH SCATTERING TO TURBULENT FLOWS WITH HEAT TRANSFER AND COMBUSTION Final Report, 1 Mar. 1980 - 30 Apr. 1982

L. Talbot and F. Robben 18 May 1982 18 p refs
(Contract F49620-80-C-0065; AF Proj. 2308)
(AD-A118576; AFOSR-82-0667TR) Avail: NTIS HC A02/MF A01 CSCL 20/4

Rayleigh scattering has been developed as a diagnostic tool and used in conjunction with Laser Doppler velocimetry to study two reacting flows; the interaction of a Karman vortex street with a flame, and the interaction of grid-produced turbulence with a flame. Vortex street interaction is characterized by radical distortion of the flame front. Dilatation effects downstream of the flame front dominate, and vortices are not discernible in this region. Numerical modeling gave qualitative agreement with the experimental results. For the grid-induced turbulence, the measured density and velocity statistics were compared with the predictions of the Bray-Moss-Libby model. It was found that intermediate states had to be taken into account. Two-point density correlation measurements, the first ever reported, showed that the length scales of turbulence within the reaction zone were the same in all three orthogonal directions. Space-time correlation measurements in the flow direction were in accord with the Taylor hypothesis.
Author (GRA)

N83-12386# California Univ., Berkeley. Dept. of Mechanical Engineering.

INVESTIGATION OF FREE-FORCED CONVECTION FLOWS IN CAVITY-TYPE RECEIVERS Progress Report, 1 Oct. 1980 - 30 Sep. 1981

J. A. C. Humphrey, F. S. Sherman, Kang Shin Chen, and Wai Ming To Jul. 1982 15 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020118; SAND-82-8190) Avail: NTIS HC A02/MF A01

A numerical calculation procedure applicable to cavity-type solar receiver configurations and flow conditions was developed. Air flow visualization experiments were performed, and experimental measurements of quantities valuable for the development of the numerical calculation procedure were made. The investigation is focussed on a configuration which is strongly two dimensional in the mean flow structure (but turbulent in a truly three dimensional sense). DOE

N83-12387# Argonne National Lab., Ill. Components Technology Div.

DEVELOPMENT OF ENHANCED HEAT TRANSFER/TRANSPORT/STORAGE SLURRIES FOR THERMAL-SYSTEM IMPROVEMENT

K. E. Kasza and M. M. Chen (Illinois Univ., Urbana-Champaign) Jun. 1982 40 p refs
(Contract W-31-109-eng-38)
(DE82-021236; ANL-82-50) Avail: NTIS HC A03/MF A01

Combined utilization of the phenomenon of increased energy transport due to the phase transition of an immiscible change of phase additive to a carrier fluid (slurry) with the recently recognized phenomenon of enhanced heat transfer at a surface due to particle/fluid boundary-layer interaction can be used to enhance overall thermal system performance. The enhancement will also be realized in conjunction with thermal systems employing direct contact heat exchangers. A benefit accruable from using phase change slurries in thermal systems rather than single phase sensible heat fluids are increased fluid/solid surface heat transfer coefficients resulting from several mechanisms. This reduces the temperature difference required for a given amount of heat transfer and allows reductions in heat transfer surface areas. DOE

N83-12388# National Bureau of Standards, Washington, D.C.
SEASONAL HEAT LOSS CALCULATION FOR SLAB-ON-GRADE FLOORS
Tamami Kusuda, M. Mizuno, and J. W. Bean Feb. 1982 51 p refs Sponsored by DOE
(PB82-182379; NBSIR-81-2420) Avail: NTIS HC A04/MF A01 CSCL 13A

In order to facilitate an efficient slab-on-grade heat transfer calculation on a comprehensive energy analysis program such as DoE-2, BLAST and NBSLD, heat transfer calculations for slab-on-grade floors are reviewed. The computational procedure based on the Lachenbruch method is studied in depth to generate monthly average temperatures at a given depth below the floor slab. The data generated by the Lachenbruch method are then used to develop a simplified procedure for determining the monthly average Earth temperatures below the floor slab. These monthly average temperature data can be used for the hourly response factor analysis of floor-slab heat transfer. Author (GRA)

N83-12389# National Bureau of Standards, Washington, D.C. National Engineering Lab.
EXPERIMENTAL INVESTIGATION OF TRANSPORT OF DISCRETE SOLIDS WITH SURGE FLOWS IN A 10.0 CM DIAMETER PARTIALLY FILLED PIPE
Bal M. Mahajan Jan. 1982 66 p refs
(Contract H-48-78)
(PB82-178724; MBSIR-81-2450) Avail: NTIS HC A04/MF A01 CSCL 13B

The transport of discrete solids with surge flows in a partially filled slightly pitched horizontal pipe was investigated. The experimental apparatus, instrumentation, and procedures are described. The experiments were conducted using a cylindrical solid in a 10.0 cm (4 in) diameter pipe. The water surge flows were obtained by discharging different volumes of water into the pipe from a falling head open container which simulated a water closet. Flow induced solid velocities and stream depth histories at various locations along the length of the pipe were measured. The effects of water volume used, pipe slope, and size of the solid on the solid velocities were examined. Solid velocities were compared with the maximum water velocities estimated from the stream depth histories. Also, the distance traversed by the solids in the pipe were measured for those cases in which the solids did not clear the pipe. The solid velocity increased with an increase in water volume used, a decrease in the size of the solid, and an increase in the pipe slope. The solid velocity in the initial reach of the pipe was less than the maximum water velocity; and the solid velocity approaches the maximum water velocity as the solid traveled downstream, except for some experiments with small water volumes. Author (GRA)

N83-12390# Wyoming Univ., Laramie. Dept. of Mechanical Engineering.
DATA COLLECTION AND ANALYSIS FOR GEOTHERMAL RESEARCH Final Report
John Nydahl, Kynric Pell, Dwight Senser, George Twitchell, and Steve Ownbey Aug. 1981 128 p refs Prepared for the Colorado Div. of Highways
(PB82-185430; CDH-UW-R-81-11; FHWA-CO-81-11) Avail: NTIS HC A07/MF A01 CSCL 13B

A prototype bridge deck heating system that utilizes heat pipes to transfer the energy between a warm water source and the deck surface was tested for possible use on some of the I-70 structures through the geothermally active Glenwood Canyon. At water flow rates around 35 GPM and temperatures of 25 C, the snow cover duration on the 59 sq m of heated surface was reduced between 96% and 100% and the deck's frozen time was reduced between 85% and 95% for the five different heat pipe configurations tested; this despite the fact that over a 1 1/4 thick sludge was deposited on all the unprotected metallic surfaces exposed to the geothermal water which caused the system's thermal resistance to double. If this system is to be viable for this application, a durable, protective coating with a low thermal resistance must be found to prevent both fouling and corrosion. The thermal analysis indicates that up to two hundred of these units can be placed in series with a tolerable degradation in the last unit's performance for water flow rates above 100 GPM. GRA

N83-12270# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.
INITIAL FINDINGS DURING STUDIES OF THE FLOW WITHIN A HIGH SPEED IMPELLER USING A TRANSIT ANEMOMETER
M. E. Gill, C. Forster, and R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 15 p refs Presented at the 4th Intern. Conf. on Photon Correlation Tech. in Fluid Mech., Stanford, Calif., Aug. 1980 (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12271# Glasgow Univ. (Scotland). Dept. of Aeronautics and Fluid Mechanics.
MEASUREMENT TECHNIQUES FOR HEAT TRANSFER IN THE TURBINE USING SHORT DURATION WIND TUNNEL TECHNIQUES
B. E. Richards *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 41 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12275# Rolls-Royce Ltd., Derby (England). Electronics and Instrumentation Group.
BLADE PRESSURE MEASUREMENTS
J. W. H. Chivers *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 21 p (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-12391# National Aerospace Lab., Tokyo (Japan).
DESIGN AND EXPERIMENTAL STUDY OF LOW NOISE HOT-WIRE ANEMOMETER WITH CONSTANT CURRENT MODE
Shohei Takagi 1982 14 p refs In JAPANESE; ENGLISH summary
(NAL-TR-697; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

A low noise hot-wire anemometer consisting of a constant current circuit, a low noise amplifier, and a frequency compensator, is described. Newly designed circuits and several techniques that reduce electric noise are described in detail. A typical applicaton for residual turbulence measurement in a wind tunnel is given. The performance of this instrument is satisfactory for the measurement of velocity fluctuations with a turbulence intensity of less than 0.05% and with frequencies of up to 5 kHz at the wind speed of 20 m/s. If the heating current for the hot wire is low, this system may be easily applied to a resistance thermometer. Author

N83-12392# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DIGITAL SOLAR SENSOR PROJECT FOR ATTITUDE DETERMINATION [PROJETO DE UM SENSOR SOLAR DIGITAL PARA DETERMINACAO DE ATITUDE]
Mario L. Selingardi and Marcos Yossimi Aug. 1982 16 p refs In PORTUGUESE; ENGLISH summary
(INPE-2495-PRE/178) Avail: NTIS HC A02/MF A01

The design of a system of a solar aspect system (SAS) arranged to operate according to a digital principle. The analog-digital

conversion of data is made optically by a binary Gray code light mask, that produces a digital indication of the elevation and azimuth angles of incident light from the sun. A prototype of such a system with 0.5 degree of accuracy, using a 7 (seven) bit digital solar sensor, is discussed. A microprocessor system was developed to select and store information of the several sensors distributed around the satellite. Author

N83-12393*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NONINTRUSIVE LASER INTERFEROMETER METHOD FOR MEASUREMENT OF SKIN FRICTION
Daryl J. Monson Oct. 1982 36 p refs
(NASA-TM-84300; A-9077; NAS 1.15:84300) Avail: NTIS HC A03/MF A01 CSCL 14B

A method is described for monitoring the changing thickness of a thin oil film subject to an aerodynamic shear stress using two focused laser beams. The measurement is then simply analyzed in terms of the surface skin friction of the flow. The analysis includes the effects of arbitrarily large pressure and skin friction gradients, gravity, and time varying oil temperature. It may also be applied to three dimensional flows with unknown direction. Applications are presented for a variety of flows including two dimensional flows, three dimensional swirling flows, separated flow, supersonic high Reynolds number flows, and delta wing vortical flows. Author

N83-12394*# Information and Control Systems, Inc., Hampton, Va.
COMPUTATIONAL MODELING OF MULTISPECTRAL REMOTE SENSING SYSTEMS: BACKGROUND INVESTIGATIONS
R. Martin Aherron Aug. 1982 51 p refs Original document was announced as A82-34243
(Contract NAS1-16367)
(NASA-CR-165974; NAS 1.26:165974) Avail: NTIS HC A04/MF A01 CSCL 14B

A computational model of the deterministic and stochastic process of remote sensing has been developed based upon the results of the investigations presented. The model is used in studying concepts for improving worldwide environment and resource monitoring. A review of various atmospheric radiative transfer models is presented as well as details of the selected model. Functional forms for spectral diffuse reflectance with variability introduced are also presented. A cloud detection algorithm and the stochastic nature of remote sensing data with its implications are considered. Author

N83-12395*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLOW VISUALIZATION IN A CRYOGENIC WIND TUNNEL USING HOLOGRAPHY
A. W. Burner and W. K. Goad Nov. 1982 22 p refs
(NASA-TM-84556; L-15510; NAS 1.15:84556) Avail: NTIS HC A02/MF A01 CSCL 14E

Results of holographic flow visualization from tests made in the Langley 0.3 meter transonic cryogenic tunnel are presented. The tunnel was operated over a temperature range from 100 to 300 K and a pressure range from 1.1 to 4 atm. Interferometry at the facility may be of limited use at the low temperature high pressure conditions because of the jumbled nature of the reference fringes. The shadowgraph technique appears to be the best means of visualizing shocks at these high density conditions. The spot size at the focus of the reconstructed beams was measured and used as an indicator of density fluctuations in the flow field. These density fluctuations appear to be caused by temperature fluctuations of the test gas which are relatively independent of tunnel conditions. Author

N83-12396*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN EVALUATION OF THE NASA/GSFC BARNES FIELD SPECTRAL REFLECOMETER MODEL 14-758, USING SIGNAL/NOISE AS A MEASURE OF UTILITY
Robin Bell and Mark L. Labovitz Jul. 1982 42 p refs
(NASA-TM-83969; NAS 1.15:83969) Avail: NTIS HC A03/MF A01 CSCL 14B

A Barnes field spectral reflectometer which collected information in 373 channels covering the region from 0.4 to 2.5 micrometers was assessed for signal utility. A band was judged unsatisfactory if the probability was 0.1 or greater than its signal to noise ratio was less than eight to one. For each of the bands the probability of a noisy observation was estimated under a binomial assumption from a set of field crop spectra covering an entire growing season. A 95% confidence interval was calculated about each estimate and bands whose lower confidence limits were greater than 0.1 were judged unacceptable. As a result, 283 channels were deemed statistically satisfactory. Excluded channels correspond to portions of the electromagnetic spectrum (EMS) where high atmospheric absorption and filter wheel overlap occur. In addition, the analyses uncovered intervals of unsatisfactory detection capability within the blue, red and far infrared regions of vegetation spectra. From the results of the analysis it was recommended that 90 channels monitored by the instrument under consideration be eliminated from future studies. These channels are tabulated and discussed. B.W.

N83-12397*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ULTRASONIC TRANSDUCER WITH GAUSSIAN RADIAL PRESSURE DISTRIBUTION Patent Application
Richard O. Claus (Virginia Polytechnic Inst. and State Univ.) and Paul S. Zerwekh, inventors (to NASA) (Virginia Polytechnic Inst. and State Univ.) Filed 2 Sep. 1982 11 p Sponsored by NASA
(NASA-Case-LAR-12967-1; US-Patent-Appl-SN-414107) Avail: NTIS HC A02/MF A01 CSCL 14B

A piezoelectric crystal has several concentric ring electrodes on one side of the crystal. A resistor network applies different amplitudes of an AC source to each of the several electrodes. A plot of the different amplitudes from the outermost electrode to the innermost electrode is the first half of a Gaussian function. Consequently, the output of the crystal from the side opposite the electrodes has a Gaussian profile. NASA

N83-12398*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
VIBRATION ISOLATION AND PRESSURE COMPENSATION APPARATUS FOR SENSITIVE INSTRUMENTATION Patent Application
Robert D. Averill, inventor (to NASA) Filed 16 Aug. 1982 15 p
(NASA-Case-LAR-12728-1; US-Patent-Appl-SN-408575) Avail: NTIS HC A02/MF A01 CSCL 14B

A system for attenuating the inherent vibration associated with a mechanical refrigeration unit employed to cryogenically cool sensitive instruments used in measuring chemical constituents of the atmosphere is described. A modular system including an instrument housing and a reaction bracket with a refrigerator unit 'floated' therebetween comprise the instrumentation system. A pair of evacuated bellows the 'float' refrigerator unit and provide pressure compensation at all levels of pressure from sea level to the vacuum of space. Vibration isolators and when needed provide additional vibration damping for the refrigerator unit. A flexible thermal strap (20 K) serves to provide essentially vibration free thermal contact between cold tip of the refrigerator unit and the instrument component mounted on the TDL mount. Another flexible strap (77 K) serves to provide vibration free thermal contact between the TDL mount thermal shroud and a thermal shroud disposed about the thermal shaft. NASA

N83-12399# Kulite Semi-Conductor Products, Inc., Ridgefield, N. J.
KILOBAR BLAST PRESSURE TRANSDUCER: 3.4 KILOBAR PIEZORESISTIVE BLAST PRESSURE SENSOR USING SILICON LOAD CELL TECHNIQUE Final Report
Joseph R. Mallon, Jr. Kirtland AFB, N. Mex. AFWL Jun. 1982 45 p refs
(Contract F29601-80-C-0005)

(AD-A118566; AFWL-TR-81-224) Avail: NTIS HC A03/MF A01 CSCL 09/1

Measurements of blast pressures in high-explosive experiments require highly specialized transducers. This report describes development of a resistance-based transducer for measurements to 3.4 kilobars. A unique transduction scheme employing a silicon cylinder incorporates diffused transverse piezoresistive elements to respond as a load cell to compressive stress. Considerations for hardening against blast thermal and shock accelerations are reflected in design of the unit. Five prototypes were fabricated and test results are presented. GRA

N83-12400# Massachusetts Inst. of Tech., Cambridge. Aerophysics Lab.

DEVELOPMENT OF AN AIRBORNE SONIC THERMOMETER Final Report, 1 Jul. 1980 - 30 Sep. 1982

Tore R. Christiansen Sep. 1982 122 p refs

(Contract F19628-80-K-0089; AF Proj. 2310)

(AD-A118774; AFGL-TR-82-0179) Avail: NTIS HC A06/MF A01 CSCL 20/1

An airborne sonic thermometer has been developed and is now ready for flight testing. The designed instrument uses a specially developed electromagnetic transmitter, a sensitive condenser microphone and integrated circuit components. The air temperature is determined by measuring the phase difference between the transmitted and received signals across an acoustic path in the medium. The phase information is delivered as a changing dc-level voltage, as a digital signal and in the form of two phase shifted squarewaves. Improvements of the present design are needed to exclude the effect of wind speed on the temperature measurement, and in the accuracy of the calibration of the signal outputs. Once these are included, however, temperature measurements to an accuracy of plus minus one tenth of a degree centrigrade, over a temperature range from plus 25 C to minus 80 C, should be available. Author (GRA)

N83-12401# Parametrics, Inc., Waltham, Mass.

OPERATION OF THE RAPID SCAN PARTICLE SPECTROMETER SC5 ON THE SCATHA SATELLITE Final Report, Apr. 1979 - Dec. 1981

Frederick A Hanser and Bach Sellers Jun. 1982 82 p refs

(Contract F19628-79-C-0099; AF Proj. 7661)

(AD-A118724; AFGL-TR-82-0164) Avail: NTIS HC A05/MF A01 CSCL 07/4

The SC5 Rapid Scan Particle Spectrometer on the SCATHA satellite was designed to measure electrons and protons from 0.05 to 500 keV. Electrostatic analyzers (ESA's) are used for the 0.05 to 70 KeV range, with 8 energy bins, and solid state spectrometers (SSS's) are used for the higher energy range. Two complete detector sets view in perpendicular and parallel directions to the satellite spin axis, and a complete set of spectra is measured once per second. With a 57 second spin period, the perpendicular detector set provides pitch angle distributions with 6 degrees resolution. The SC5 instrument can also be connected to a broad-band FM channel where the output of any one detector can be viewed with 250 microsecond time resolution. The SCATHA satellite was launched on 30 January 1979, and SC5 was turned on 9 February 1979. Since then it has provided a considerable amount of particle data for an environmental atlas, and much unique data, especially from the high time resolution FM band, for electron and ion gun operations. The complete detector set has operated properly for over a year, well in excess of the design life of six months. The SC5 data analysis procedure is described, and several examples of reduced spectra and pitch angle distributions are given. Some examples of FM data from the electron gun operations are also given. GRA

N83-12402# Rockwell International Corp., Golden, Colo. Energy Systems Group.

AUTOMATED BALANCE FOR DETERMINING TRUE MASS

J. E. Meyer, G. A. Riordan, ed., and L. M. Morales, comp. 8 Aug. 1982 28 p

(Contract DE-Ac04-76DP-03533)

(DE82-021737; RFP-3290) Avail: NTIS HC A03/MF A01

An automated weighing system utilizing a precision electronic balance and a small desktop computer is described. An example of a computer program demonstrating some of the capabilities attainable with this system is included. The program demonstrates a substitution weighing technique with true mass determination for the object being weighed. DOE

N83-12403# Cornell Univ., Ithaca, N. Y. School of Chemical Engineering.

HEAT OF MIXING APPARATUS FOR LIQUEFIED GASES Annual Report, Nov. 1981 - Nov. 1982

W. B. Streett 2 Jan. 1982 10 p

(Contract GRI-5080-363-0351)

(PB82-195645; HMA-1-82) Avail: NTIS HC A02/MF A01 CSCL 14B

A heat of mixing apparatus for measuring heats of mixing of liquefied gases was designed and built. It was tested by measuring the heats of mixing of liquid nitrogen and oxygen at 77.3 K. GRA

N83-12404# Cincinnati Univ., Ohio. Computing Center.

THE CONTINUOUS FLOW ANALYZER AUTOMATION SYSTEM. PART 1: FUNCTIONAL SPECIFICATIONS

Jonathan E. Kopke and John M. Teuschler Jul. 1981 49 p refs

(Contract GS-05S-10458)

(PB82-191081; EPA-600/4-81-064-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 14B

A computer automation system for continuous flow analyzer is discussed. The system accomplishes real time data acquisition calibration, baseline correction, calculation of concentrations, dilution and remeasurement of offscale samples, on line quality control checks, reagent blank subtraction, plotting of calibration curves and raw data, and bidirectional communication with the sample file control system. This automation system facilitates routine measurement of large numbers of samples, while providing the flexibility needed for a research environment. GRA

N83-12405# Physical Research Lab., Ahmedabad (India).

A BAKABLE GLASS PIRANI GAUGE FOR MONITORING LOW VACUUM

S. K. Bhattacharya and K. Gopalan May 1981 14 p

(PB82-190307; PRL/TN-81-06) Avail: NTIS HC A02/MF A01 CSCL 14B

A glass Pirani gauge of simple design made from thin diameter tungsten wire is described. The associated circuit was simplified and made from indigenous components. The system is cheap, reliable, and can be used in any glass system which requires baking up to about 300 C. It is in continuous use in the gas extraction system at the stable isotope laboratory. Author

N83-12406# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.

A CALIBRATOR FOR OPTICAL INSTRUMENTS THAT MEASURE Cn2 AND CROSSWIND

B. W. Guderian and G. R. Ochs Nov. 1981 15 p refs

(Contract ASL-81-8030)

(PB82-188020; NOAA-82021905; NOAA-TM-ERL-WPL-88) Avail: NTIS HC A02/MF A01 CSCL 14B

A calibrator for optical instruments that measure the refractive index structure parameter C sub n to the second power and crosswinds is described. Operating instructions, alignment procedures, and circuit diagrams are included. GRA

N83-12273# Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Groupe de Recherches.

MEASUREMENT TECHNIQUES IN TURBOMACHINES, ULTRATHIN TRANSDUCERS APPLIED TO MEASUREMENTS IN TURBOMACHINES

J. Paulon, M. Portat, J. C. Godefroy, and E. Szechenyi *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 27 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

N83-12274# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium). Dept. of Turbomachinery.
HOT WIRE THERMAL TUFT DEVELOPMENT FOR MEASUREMENT OF FLOW REVERSAL NEAR A COMPRESSOR BLADE
B. Gyles and P. M. Ligrani *In its* Meas. Tech. in Turbomachines 1981 47 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-12407# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RESONANT EXTINCTION OF LIDAR RETURNS FROM THE ALKALI METAL LAYERS IN THE UPPER ATMOSPHERE
Dale Martin Simonich and Barclay Robert Clemesha Jul. 1982 15 p refs Submitted for publication
(INPE-2493-PRE/176) Avail: NTIS HC A02/MF A01

Resonant extinction is shown to have a small but significant effect on lidar returns from upper atmospheric sodium. An equation to correct for it is developed and the magnitude of the correction for broadband and monochromatic lasers is discussed. Author

N83-12408# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
LASER VELOCIMETRY
1981 498 p refs Lecture series held at Rhode-Saint-Genese, Belgium, 23-26 Feb. 1981
(VKI-LS-1981-3) Avail: NTIS HC A21/MF A01

The adaptation of laser velocimeters to various applications is discussed. The principles of laser anemometry are reviewed. Various means of frequency shifting of laser light are discussed. One, two, and three dimensional laser velocimeters are discussed. R.J.F.

N83-12409# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
OPTICAL SYSTEMS IN LASER ANEMOMETRY
A. Boutier *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 46 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The basic principles of laser velocimetry and especially the most widely used optical set up, the fringe velocimeter, are described. The various means to determine the velocity sign are reviewed: their utilization in a velocimeter allows to study highly turbulent flows, separated, and recirculation zones. The optical components making up one, two, and three dimensional laser velocimeters are described. It is explained why two focus velocimeters are advantageous for turbomachines experiments. R.J.F.

N83-12410# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
ADAPTATION OF LASER VELOCIMETERS TO VARIOUS APPLICATIONS
A. Boutier *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 34 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The requirements for a laser velocimeter working in wind tunnels are discussed as well as the elements making up an operational laser velocimeter. Some set ups which are currently operated in aerodynamic flows are described. R.J.F.

N83-12411# Office National d'Etudes et de Recherches Aerospatiales, Paris (France).
HIGH VELOCITY MEASUREMENTS: SPECIAL REQUIREMENTS
A. Boutier *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 10 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The problems which can arise obtaining good results in high velocity flows using laser Doppler velocimeters are discussed. Some recommendations are given for handling some difficult situations. Finally three ways other than fringe laser velocimetry to perform velocity measurements are discussed: two focus velocimetry, a fluorescence technique, and the study of Doppler shifted light by a Michelson spectrometer. R.J.F.

N83-12412# Karlsruhe Univ. (West Germany).
LAY-OUT OF OPTICAL SYSTEMS FOR LASER DOPPLER ANEMOMETERS
Franz Durst *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 17 p (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The layouts of optical systems for laser doppler anemometers are described. Schematic drawings are given. Beamsplitters, backscattering, and forward scattering are discussed. Recommendations are given. The propagation of Gaussian light beams through lenses is discussed. R.J.F.

N83-12413# Karlsruhe Univ. (West Germany).
MEASUREMENTS IN LIQUID FLOWS: REFRACTIVE INDEX MATCHING
Franz Durst *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 17 p (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Various measurements in fluid flows are given and laser Doppler velocimeter measurements are discussed. The necessity of refractive index matching in special cases is discussed. Two related questions are addressed: In which cases is the beam separation spatially independent, and what can be measured without refractive index matching? What methods exist to eliminate the refractive index influence and which fluids can be used are other questions that are discussed. Measurements with matched refractive indices are presented in bubble flows, stirred tanks, nuclear reactor fuel bundles, solid-liquid two phase flows, and pipe flows with high molecular polymers. R.J.F.

N83-12414# Karlsruhe Univ. (West Germany).
STUDIES OF PARTICLE MOTION BY LASER DOPPLER TECHNIQUES
Franz Durst *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 29 p refs Document also announced as A79-39493 (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The application of laser Doppler anemometers (LDA) to investigations of particulate flow systems is discussed. The basic principles of LDA measurements in particulate two phase flows are outlined and it is shown that correct LDA measurements require the optical system to consist of two parts that information relating to the properties of the moving particles. The various information on particulate flow systems which is contained in the optical signals is explained and electronic processing systems are introduced that permit this information to be extracted. Results that were obtained for a laminar bubble driven liquid flow and for a turbulent gas flow of suspended particles are given. Implications of these results to improve the present knowledge on particle motion in turbulent flows are provided. R.J.F.

N83-12415# Karlsruhe Univ. (West Germany).
LONG RANGE LDA WIND VELOCITY MEASUREMENTS USING VISIBLE LASER RADIATION
Franz Durst *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 14 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Experimental investigations were carried out to verify that long range laser Doppler anemometer wind velocity measurements are feasible with visible laser radiation. Backscattered photon resolved signals were detected up to 105 m, the maximum range attempted

employing natural aerosols and using an estimated light power of 2.5 W in the measuring volume. Several examples of detected signals are shown. Predictions using information from the experiments and using Mie-scattering programs indicate that measurements to at least 500 m should be possible with existing laser power. R.J.F.

N83-12416# Karlsruhe Univ. (West Germany).
TURBULENCE QUANTITIES AND REYNOLDS STRESS IN PIPE FLOW OF POLYMER SOLUTIONS MEASURED BY TWO CHANNEL LASER DOPPLER ANEMOMETRY
Franz Durst, T. Keck, and R. Kleine *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 11 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Detailed measurement in turbulent liquid pipe flows with and without polymer additives are described. The measurements were carried out with laser Doppler anemometry (LDA). Laser Doppler anemometry, it is pointed out, does not have the disadvantages of probe type sensor errors, but requires the application of refractive index matching in order to permit near wall measurements of mean velocities and turbulence properties in pipe flows. A test section is described which was built to permit LDA measurements in the near wall region of a pipe flow by using an oil as fluid having the same refractive index as the glass of which the pipe is made. Detailed mean velocity and turbulence measurements in water are reported for various Reynolds numbers. Data are given for two Reynolds numbers composing the Newtonian flow data with those obtained in polymer flows. The data are discussed in detail and are compared with solutions of the Reynolds equations. R.J.F.

N83-12417# Karlsruhe Univ. (West Germany).
HEAT AND MASS TRANSFER IN TURBULENT, PARTICULATE TWO PHASE FLOWS
R. S. L. Lee and Franz Durst *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 11 p (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Calculations of heat and mass transfer in turbulent particulate two phase flows were done based on model studies. Results indicate that existing models do not permit exact computation of turbulence transport of particles and hence, do not allow the computation of particle deposition rates. It is noted that the transport of particles due to turbulent diffusion is limited to the core region of a turbulent flow pipe. B.W.

N83-12418# German-French Research Inst., Saint-Louis (France).
INTRODUCTION TO LDA SIGNAL ANALYSIS AND SIGNAL PROCESSING
Hans-Joachim Pfeifer *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 22 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The present introduction into LDA signal analysis and processing starts with a description of signal generation in fringe type laser Doppler anemometry. Signal characteristics are derived for both single particles and multiple particle systems. On the basis of these characteristics various signal analysis systems working either in the frequency domain or in the time domain are compared with each other. Author

N83-12419# German-French Research Inst., Saint-Louis (France).
SIGNAL PROCESSING BY COUNTERS AND DIGITAL PROCESSING OF LDA SIGNALS
Hans-Joachim Pfeifer *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 26 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Counter processors play more and more a dominant role among the instruments for LDA data acquisition. A description is given of both dual and single counter systems. Statistical errors caused by the limited number of individual realizations in counter systems are discussed and problems of statistical bias are pointed out. A particular equipment for data acquisition, processing, and data reduction serves as an example for the high efficiency attainable with counter processors. B.W.

N83-12420# German-French Research Inst., Saint-Louis (France).
MEASUREMENTS IN GAS FLOWS AND FLAMES
Hans-Joachim Pfeifer *In* Von Karman Inst. for Fluid Dynamics Laser Velocimeters 1981 24 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The particular requirements for LDA applications to gas flows and flames are reviewed. Special emphasis is placed upon the characteristics of the interference fringe systems produced in spite of strong variations of the optical refractive index along the propagation path of the laser beams. Conditions of optimum particle size and methods for particle sizing are described for both cold and hot gaseous flows. The particles response to strong variations in the flow velocity is theoretically estimated and experimentally verified. Finally some results of LDA applications to flames will demonstrate the performances as well as the limitations of this technique. Author

N83-12421# Brown, Boverie und Cie, A.G. Baden (Switzerland).
INSTRUMENTATION FOR LDA SIGNAL PROCESSING
Adran Melling *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 73 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

An overview is given of the various signal processors which may be used in laser Doppler anemometry. The emphasis is on a comparison of the signal processors from the user's point of view. Guidelines on the performance of the instruments are given, to provide the potential user with the information necessary to choose the signal processor most appropriate to his application. The most important factors in the choice of instrumentation are presented, and a brief comparison of seven instruments on the basis of these factors is given. B.W.

N83-12422# Brown, Boverie und Cie, A.G. Baden (Switzerland).
PARTICLE BEHAVIOUR IN FLOWS AND SUITABLE PARTICLES FOR LDA MEASUREMENTS
Adrian Melling *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 70 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

The light scattering characteristics and the aerodynamic behavior of particles in laser anemometry are discussed. Particle size requirements are analyzed. A rigorous analysis is restricted to spherical particles, useful and reliable criteria are obtainable in a variety of flow situations. Particle generators for producing suitably sized, solid or liquid particles in an appropriate concentration are discussed. Techniques for introducing the particle into the flow are also considered. Methods to control and measure the sizes of the generated particles are presented. B.W.

N83-12423# Brown, Boverie und Cie, A.G. Baden (Switzerland).
FURTHER DEVELOPMENTS IN LASER ANEMOMETRY
Adrian Melling *In* Von Karman Inst. for Fluid Dynamics Laser Velocimetry 1981 43 p refs (For primary document see N83-12408 03-36)
Avail: NTIS HC A21/MF A01

Interferometric methods for measurement of the Doppler frequency shift are examined. Difficulties in measuring high Doppler frequencies with multi-mode lasers are considered. Fluorescent particle size and velocity are discussed. Comments are made on laser dual focus anemometry. Finally, a selection of practical problems encountered in many experiments is looked at. B.W.

N83-12424# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
MEASUREMENTS IN PARTICULATE TWO PHASEFLOWS
M. L. Riethmuller and L. Lourenco *In its* Laser Velocimetry 1981 45 p refs (For primary document see N83-12408 03-36)

Avail: NTIS HC A21/MF A01

Scattering particles in two phase flows are measured by the use of laser Doppler velocimetry. The laser Doppler velocimeters used in two phase flows are coupled with concentration measurement systems and gas velocity may be measured simultaneously. Discrete and continuum phase measurements are discussed. B.W.

N83-12425# Harvard Univ., Cambridge, Mass. Dept. of Chemistry.

SPECTROSCOPIC DETERMINATION OF INTERMOLECULAR POTENTIALS OF GAS LASER COMPONENTS AND OF MAJOR ATMOSPHERIC CONSTITUENTS Final Report

William Klemperer 1982 8 p

(Grant AF-AFOSR-3269-77; AF Proj. 2303)

(AD-A118698; AFOSR-82-0661TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

A systematic study of the structure of weakly bound complexes of hydrogen fluoride has been accomplished. This research provides a broad account of the interaction of hydrogen fluoride with a variety of laser components and atmospheric constituents. Precision structures are now available for the species ArHF, CO2HF, N2OHF and SCOHF as a result of the present research program. In addition, precision structures have been obtained for ArCO2 and ArN20. This research provides the basic information necessary for reliable modelling of intermolecular forces between HF and Ar, Co2, N20 and OCS as well as between Ar and CO2 and N20. GRA

N83-12426# Virginia Univ., Charlottesville. Dept. of Chemistry.

NEW LASER DYE SYSTEMS BASED ON TRANSITION METAL COMPLEXES Final Report, 1 Jun. 1978 - 31 May 1982

James N. Demas 31 May 1982 13 p refs

(Grant AF-AFOSR-3590-78; AF Proj. 2303)

(AD-A118699; AFOSR-82-0662TR) Avail: NTIS HC A02/MF A01 CSCL 20/5

Excited state properties of luminescent ruthenium (II) complexes and their interactions with laser dyes, other metal complexes, and oxygen have been studied in both homogeneous and surfactant containing solutions and in solid polymer matrices. Low cost experimental tools have been developed to facilitate these studies. These include a low cost temperature controller, a simple deoxygenation cell for surfactant solutions, and a low frequency computerized lockin amplifier. Also, new quantum counters for light intensity measurements have been developed. Energy transfer from ruthenium (II) complexes to a variety of rhodamine and oxazine laser dyes has been demonstrated in both homogeneous solutions and in surfactant-assisted ones. Singlet energy transfer efficiencies from the charge transfer (CT) sensitizing state of the Ru(II) complex to the laser dyes in homogeneous solutions are unity, and in surfactant-assisted systems efficiencies are 45-75% at concentrations of 10-5M. GRA

N83-12427# California Univ., Livermore. Lawrence Livermore Lab.

UNIFORM LASER ABLATIVE ACCELERATION OF TARGETS AT 10(14) W/cm(2)

S. P. Obenschain, R. R. Whitlock, E. A. Mclean, B. H. Ripin, R. H. Price, D. W. Phillion, E. M. Campbell, and M. D. Rosen 10 Aug. 1982 13 p refs Prepared in cooperation with NRL

(Contract W-7405-eng-48)

(DE82-020426; UCID-19483) Avail: NTIS HC A02/MF A01

The ablative acceleration of planar targets was investigated while simultaneously using high irradiance (10 to the 14th power) W/sq cm, large focal diameters (1 mm) and long laser pulse duration (3 nsec). Measurements of target preheat, ablation pressures and uniformity achieved under these conditions are presented. Targets were accelerated to high velocities with velocity profile uniformity approaching that required for high gain pellet implosions. DOE

N83-12428# Pacific Northwest Lab., Richland, Wash.

IMPROVED MANUFACTURING TECHNIQUES FOR rf AND LASER HARDENING OF MISSILE DOMES, PHASE 1

W. T. Pawlewicz, I. B. Mann, P. M. Martin, D. D. Hays, and A. G. Graybeal Jul. 1982 73 p refs

(Contract DE-AC06-76RL-01830)

(DE82-020117; PNL-4335) Avail: NTIS HC A04/MF A01

The adaptation of an existing Pacific Northwest Laboratory (PNL) optical coating capability developed for high power fusion laser applications to the case of RF and laser hardening of plastic missile domes used by US Army (MICOM) is reported. RF hardening of Hellfire and Copperhead 1.06 micron missile domes by use of transparent conductive Indium Tin Oxide (ITO) coatings is demonstrated. The project involved adaptation of a coating material and process developed for flat glass components used in fusion lasers to the case of hemispherical or conical heat sensitive plastic domes used on laser guided missiles. Specific ITO coating property goals are an electrical sheet resistance of 10 ohms/square, a coated dome transmission of 80% or more at 1.06 micron wavelength (compared to 90% for a bare dome), and good adhesion. The sheet resistance goal of 10 ohms/square was expected to result in an RF attenuation of 30 dB at the frequencies of importance. DOE

N83-12429# TRW, Inc., Redondo Beach, Calif.

DIRECT BEAM-QUALITY MEASUREMENT IN PULSED AERODYNAMIC WINDOWS Final Report, Aug. 1981 - May 1982

V. A. Kulkarny, J. Shwartz, and M. Saffman 12 Aug. 1982 17 p refs

(Contract DE-AC08-81DP-40141)

(DE82-019285; DOE/DP-40141/1) Avail: NTIS HC A02/MF A01

Aerodynamic windows provide pressure and gas species isolation interfaces which are transparent to laser radiation. For short, high-energy laser pulses, the transient flowfield in a shock tube may be used as a single shot window. Here the laser pulse is transmitted along the tube axis a short time after the diaphragm ruptures. The feasibility of this Pulsed Aerodynamic Window concept was experimentally investigated in order to establish the optical transmission quality of the transient flowfield in the tube. In the previous phase of this effort the OPDF of the shock tube medium was characterized with interferometry. The present phase addressed a direct measurement of the beam quality of a laser pulse transmitted through the shock tube flowfield, by recording the intensity pattern at a focus. DOE

N83-12430# Los Alamos Scientific Lab., N. Mex.

ATTEMPTS AT ULTRAVIOLET LASER INITIATION OF NITROMETHANE AND PETN

J. J. Dick Aug. 1982 10 p refs

(Contract W-7405-eng-36)

(DE82-021253; LA-9489-MS) Avail: NTIS HC A02/MF A01

The feasibility of detonation initiation by direct photolytic decomposition of explosive molecules and subsequent chain reaction was investigated. Excimer lasers with wavelengths from 193 to 308 nm were used to deposit several tenths of joule of energy in nitromethane and PETN in about 40 ns. Attempts to achieve initiation were unsuccessful. Reasons for this are explored. DOE

N83-12268# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.

INTRODUCTION TO LASER ANEMOMETRY STUDIES IN TURBOMACHINERY

R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 20 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

N83-12269# Cranfield Inst. of Tech., Bedfordshire (England). School of Mechanical Engineering.

ANALYSIS OF LASER DOPPLER ANEMOMETER DATA ARISING FROM HIGH SPEED TURBOMACHINERY STUDIES

M. E. Gill, C. Forster, and R. L. Elder *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 23 p refs (For primary document see N83-12260 03-31)

Avail: NTIS HC A23/MF A01

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-12431*# Detroit Diesel Allison, Indianapolis, Ind.
ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS Semiannual Report, 1 Oct. 1979 - 30 Jun. 1980
May 1981 285 p refs
(Contract DEN3-168)
(NASA-CR-165178; DOE/NASA/0168-80/1; NAS 1.26:165178; DDA-EDR-10327; SAR-1) Avail: NTIS HC A13/MF A01 CSCL 21E

Preliminary layouts were made for the exhaust system, air induction system, and battery installation. Points of interference were identified and resolved by altering either the vehicle or engine designs. An engine general arrangement evolved to meet the vehicle engine compartment constraints while minimizing the duct pressure losses and the heat rejection. A power transfer system (between gasifier and power turbines) was developed to maintain nearly constant temperatures throughout the entire range of engine operation. An advanced four speed automatic transmission was selected to be used with the engine. Performance calculations show improvements in component efficiencies and an increase in fuel economy. A single stage centrifugal compressor design was completed and released for procurement. Gasifier turbine, power turbine, combustor, generator, secondary systems, materials, controls, and transmission development are reported. Author

N83-12432*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ELASTOHYDRODYNAMIC LUBRICATION THEORY
Bernard J. Hamrock and Duncan Dowson (Leeds Univ.) Oct. 1982 56 p refs
(NASA-TM-81695; E-209; NAS 1.15:81695) Avail: NTIS HC A04/MF A01 CSCL 11H

The isothermal elastohydrodynamic lubrication (EHL) of a point contact was analyzed numerically by simultaneously solving the elasticity and Reynolds equations. In the elasticity analysis the contact zone was divided into equal rectangular areas, and it was assumed that a uniform pressure was applied over each area. In the numerical analysis of the Reynolds equation, a phi analysis (where phi is equal to the pressure times the film thickness to the 3/2 power) was used to help the relaxation process. The EHL point contact analysis is applicable for the entire range of elliptical parameters and is valid for any combination of rolling and sliding within the contact. Author

N83-12433*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FERROGRAPHIC AND SPECTROMETER OIL ANALYSIS FROM A FAILED GAS TURBINE ENGINE
William R. Jones, Jr. 1982 15 p refs Presented at the Intern. Conf. on Advan. in Ferrography, Swansee, UK, 22-24 Sep. 1982
(NASA-TM-82956; E-1267; NAS 1.15:82956) Avail: NTIS HC A02/MF A01 CSCL 14D

An experimental gas turbine engine was destroyed as a result of the combustion of its titanium components. It was concluded that a severe surge may have caused interference between rotating and stationary compressor that either directly or indirectly ignited the titanium components. Several engine oil samples (before and after the failure) were analyzed with a Ferrograph, a plasma, an atomic absorption, and an emission spectrometer to see if this information would aid in the engine failure diagnosis. The analyses indicated that a lubrication system failure was not a causative factor in the engine failure. Neither an abnormal wear mechanism nor a high level of wear debris was detected in the engine oil sample taken just prior to the test in which the failure occurred. However, low concentrations (0.2 to 0.5 ppm) of titanium were evident in this sample and samples taken earlier. After the failure, higher titanium concentrations (> 2 ppm) were detected in oil samples taken from different engine locations. Ferrographic analysis indicated that most of the titanium was contained in spherical metallic debris after the failure. The oil analyses eliminated a lubrication system bearing or shaft seal failure as the cause of the engine failure. Author

N83-12434*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TOOL FOR RELEASING OPTICAL ELEMENTS Patent Application
Jeffery S. Gum, inventor (to NASA) Filed 30 Sep. 1982 4 p
(NASA-Case-GSC-12794-1; US-Patent-Appl-SN-431421) Avail: NTIS HC A02/MF A01 CSCL 13I

An optical element mounted between the spring arms of a bracket can be released by using a tool which has a housing forming a cavity and hook shaped distal sections of several elongate members. These members extend into the cavity through the housing to engage the spring arms. Threaded proximal sections of the elongate members are drawn through holes in the housing by adjustment of fasteners on the exterior of the housing, thereby pulling the hook shaped sections outward and causing the spring arms to be spread apart to release the optical element. NASA

N83-12435# Naval Ship Research and Development Center, Bethesda, Md.
CALCULATION OF CONTACT PRESSURES AND FRICTIONAL EFFECTS ON MECHANICAL CONTACT SURFACES BY FINITE ELEMENT METHODS WITH APPLICATION TO FRETTING DAMAGE PREDICTION
Douglas E. Lesar Aug. 1982 139 p refs
(ZR0230301)
(AD-A118583; DTNSRDC-82/033) Avail: NTIS HC A07/MF A01 CSCL 12/1

Contact stresses, contact forces, relative contact surface displacements, and the dissipative effects of friction are computed, by the finite element method, for various two and three dimensional contact problems. The finite element technique is verified by analysis of several two dimensional frictionless contact problems; the Hertz contact of two cylinders, a rigid sleeve/elastic shaft shrinkfit, and an elastic sleeve/elastic shaft shrinkfit. In these cases the finite element calculations compare favorably to existing solutions. The contact analysis capability is extended to frictional contacts by considering plane stress and axisymmetric contact problems with friction and slip, for which reasonable results are produced. The capability is further extended to complex three dimensional contacts by an effort to determine the contact forces and frictional dissipation taking place in the cyclic bending of a shrinkfit assembly. This work demonstrates that advanced nonlinear finite element methods can be used to solve a variety of mechanical engineering problems involving unlubricated contact surfaces and the effects of friction. Author (GRA)

N83-12436# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
HEAT SOURCE: MATERIALS INTERACTIONS DURING FUSION WELDING Annual Technical Report, 15 Feb. 1981 - 14 Feb. 1982
T. W. Eagar, A. Block-Bolten, C. Allemand, D. Hardt, J. Katz, C. Huntington, G. Hunter, G. Dunn, S. K. Fan, and A. Lynch 30 Apr. 1982 134 p refs
(Contract N00014-80-C-0384)
(AD-A118776; ATR-2) Avail: NTIS HC A07/MF A01 CSCL 13/8

This report summarizes the second year of research involving spectrographic and thermodynamic studies of vapor emission from welding arcs, infrared measurement of the weld pool surface temperature, electroslag welding of titanium, fracture toughness of HY-80, sensors for weld automation and laser welding of aluminum. All results are preliminary except for preprints of five technical papers which have been submitted for publication. Author (GRA)

N83-12437# General Electric Co., Schenectady, N. Y.
DEVELOPMENT OF HIGH TEMPERATURE TURBINE SUB-

SYSTEM TECHNOLOGY TO A TECHNOLOGY READINESS STATUS, PHASE 2 Quarterly Report, Jul. - Sep. 1981
M. W. Horner Oct. 1981 91 p refs
(Contract DE-AC01-76ET-10340)
(DE82-003222; DOE/ET-10340/119) Avail: NTIS HC A05/MF A01

A high temperature gas turbine for use in a combined cycle power plant, with coal derived fuel at a firing temperature of 26000 F and with growth capability to 30000 F was developed. Component design and technology testing in critical areas; and system design and tradeoff analyses in sufficient depth to support the component design and test tasks were performed; and the combined cycle plant studies to evaluate the commercial viability of a GE-TRV gas turbine system were updated. The turbine, combustor, hot gas cleanup system and other components were evaluated. DOE

N83-12438# Westinghouse Research and Development Center, Pittsburgh, Pa.
DEVELOPMENT OF AUTOMATED WELDING PROCESS FOR FIELD FABRICATION OF THICK-WALLED PRESSURE VESSELS Final Report
I. Stol 1 Sep. 1981 179 p refs
(Contract DE-AC05-78ET-13511)
(DE82-003062; DOE/ET-13511-T10) Avail: NTIS HC A09/MF A01

Procedures to produce high reliability joints with properties comparable to the base material were investigated. Procedure development and qualification for narrow groove gas tungsten arc welding of SA 387 Grade 22 Class 2 steel (2 1/4% Cr-1% Mo) to 4 inch thickness is reviewed. Welding was conducted in the horizontal (2G) and vertical (3G) position. It is found that field fabrication is an economically efficient process with high quality, reliability, and productivity. GRA

N83-12439# R and D Associates, Marina Del Rey, Calif.
CONCEPT EVALUATION OF AUTOMOTIVE PROPULSION USING LIQUID AIR/NITROGEN, TASK 5 REPORT
J. L. Dooley and R. P. Hammond Jul. 1982 12 p refs
(Contract DE82-01968; RDA-TR-118700-004)
Avail: NTIS HC A02/MF A01

Two alternative programs for developing a vehicle to demonstrate the performance of an automotive propulsion system using liquid air or nitrogen in a Rankine cycle engine are described. Program A is a two-stage development in which the initial stage is an examination in depth of the most critical areas of concept components without undertaking confirmatory hardware testing and development. The second stage would continue the work with bench testing, complete component hardware development, and construction and testing of an instrumented roadable test vehicle and a demonstration vehicle. Program B is a coordinated, interactive analysis, design and development course that results in a driveable demonstration vehicle in the shortest time and at the lowest cost. It permits many low-cost bench tests to verify design early in the program. Operation of larger components can be done soon enough to get maximum feedback and interaction into the system design. The first two-stage program is justifiable and expedient in a period when adequate development funds are currently unavailable but may become available at a later date, while the alternative coordinated program is the more expeditious pathway to the goal of a successful demonstration of the concept. DOE

N83-12440# Energy and Environmental Analysis, Inc., Arlington, Va.
ASSESSMENT OF CURRENT AND PROJECTED FUTURE TRENDS IN LIGHT-DUTY-VEHICLE FUEL SWITCHING. SUBTASK 1
Jun. 1982 49 p refs
(Contract DE-AC01-78PE-70045)
(DE82-018816; DOE/PE/70045-T3) Avail: NTIS HC A03/MF A01

Trends in fuel switching by motorists during the period 1978 through 1981 were assessed with the use of two data bases of monthly household purchases of gasoline. Fuel switching was defined as either misfueling - the use of leaded gasoline in cars that require unleaded fuel - or discretionary switching - the use of unleaded gasoline in cars which can operate on leaded fuel. To identify disaggregated patterns of fuel switching, the data were stratified by year, season, census region, type of service station outlet, vehicle category and vintage. In addition, the relationship of trends in misfueling rates to changes in the relative prices of unleaded and leaded gasoline also were examined. Drawing upon the analysis of current data, three alternative future trends in misfueling rates by vehicle vintage were constructed. The impact of each of these cases on projections of the market share of leaded gasoline was examined with the aid of a previously developed model of highway fuel demand. DOE

N83-12167*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TRIBOLOGY
Donald H. Buckley *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 391-410 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 20K

N83-12261# Pratt and Whitney Aircraft, East Hartford, Conn.
INTRODUCTION: MEASUREMENTS OF STEADY STATE FLUID DYNAMIC QUALITIES
W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 38 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12262# Pratt and Whitney Aircraft, East Hartford, Conn.
MEASUREMENT OF NON-STEADY FLUID DYNAMIC QUANTITIES
W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 27 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12263# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
PROBLEMS OF MEASUREMENT OF DYNAMIC WALL PRESSURES
R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 18 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12264# Pratt and Whitney Aircraft, East Hartford, Conn.
MEASUREMENT OF METAL TEMPERATURE HEAT FLUX AND STRAIN
W. G. Alwang *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 25 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12265# Brown, Boverie und Cie, A.G. Baden (Switzerland). Optical Measurement Technique Group.
VIBRATION AND CLEARANCE MEASUREMENTS ON ROTATING BLADES USING STATIONARY PROBES
H. Roth *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 36 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12266# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
APPLICATION OF STRAIN GAUGES AND THERMOCOUPLES TO ROTATING AND STATIONARY HARDWARE
R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 16 p ref (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12267# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
SIGNAL TRANSMISSION VIA SLIPRINGS AND TELEMETRY
R. DeRose *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Fluid Dyn. 1981 46 p (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

N83-12272# National Aerospace Lab., Amsterdam (Netherlands).
LASER DOPPLER MEASUREMENTS IN TRANSPARENT PUMP IMPELLERS
H. Kannemans *In* Von Karman Inst. for Fluid Dyn. Meas. Tech. in Turbomachines 1981 50 p refs (For primary document see N83-12260 03-31)
Avail: NTIS HC A23/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-12441# Maryland Univ., College Park. Dept. of Management and Statistics.
DETECTION OF FAULTY INSPECTION
Norman L. Johnson (North Carolina Univ., Chapel Hill) and Samuel Kotz Aug. 1982 13 p refs
(Contract N00014-81-K-0301; Grant NSF MCS-80-21704)
(AD-A118549) Avail: NTIS HC A02/MF A01 CSCL 12/1

Some heuristic tests for detection of existence of errors in inspection are proposed. Some of these tests are only effective if the sampling function ((sample size)/(lot size)) is rather large, and in all cases their application predicates special experiments to provide the requisite data. Feasibility or these experiments will vary according to specific circumstances. Estimation of the probability of detection is discussed. Author (GRA)

N83-12442# Analytics, Inc., Bloomington, Ind.
DEVELOPMENT OF A SYSTEM TO INVERT EDDY-CURRENT DATA AND RECONSTRUCT FLAWS Final Report
Harold A. Sabbagh and L. David Sabbagh 18 Jun. 1982 49 p refs
(Contract N60921-81-C-0302; SF61544508)
(AD-A118767; TR-2-82) Avail: NTIS HC A03/MF A01 CSCL 11/6

Starting from rigorous electromagnetic theory, a model for the inversion of eddy-current data to reconstruct flaws in circular cylindrical tubes is developed. The form of the model consists of integral equations, whose kernels (Green's functions) are computed using Fourier transforms. The unknowns in the principal integral equation are the conductivity and electric field in the flawed region. Because these unknowns appear multiplied together, the problem is really nonlinear. The integral equations are converted to algebraic (vector-matrix) form by means of the method of moments. The inversion process is completed by applying linear and nonlinear least-squares algorithms, that are contained in the commercially available LINPACK/MINPACK software packages, to these algebraic equations. Using these algorithms in the model, we have reconstructed numerically-generated flaws with great accuracy, both when the flaws are 'deterministic' and 'random', the latter with data that has been perturbed by as much as 20%. Examples of these inversions, using both the linear and nonlinear algorithms, are presented. In addition, the model can be extended in a straightforward way to include the effects of known irregularities, such as tube supports or tube-flaring, on the reconstruction of flaws. Author (GRA)

N83-12443# Houston Univ., Tex. Dept. of Electrical Engineering.
ELECTROMAGNETIC METHODS OF NONDESTRUCTIVE EVALUATION Final Report, 30 Sep. 1977 - 30 Apr. 1981
Stuart A. Long and A. B. ElKareh 18 May 1981 43 p refs
(Grant AF-AFOSR-3457-77; AF Proj. 2307)
(AD-A118587; AFOSR-82-0674TR) Avail: NTIS HC A03/MF A01 CSCL 14/2

A study of quantitative nondestructive eddy current testing techniques on nonferromagnetic structural metals has been completed. In addition an investigation was made of electromagnetic surface wave propagation in a dielectric layer on a conducting substrate. Author (GRA)

N83-12168*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FUNDAMENTALS OF ULTRASONIC NDE FOR MICROSTRUCTURE/MATERIAL PROPERTY INTERRELATIONS
A. Vary *In* NASA. Langley Research Center Advan. Mater. Technol. Nov. 1982 p 411-420 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 14D

N83-12169*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCES IN NONDESTRUCTIVE EVALUATION TECHNOLOGY
Joseph S. Heyman *In its* Advan. Mater. Technol. Nov. 1982 p 421-440 refs (For primary document see N83-12147 03-23)
Avail: NTIS HC A19/MF A01 CSCL 14D

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-12444# Polish Academy of Sciences, Warsaw. Inst. Podstawowych Problemow Techniki.
NONLINEAR DYNAMICS OF AXISYMMETRIC BODIES AND SHELLS SUBJECTED TO ARBITRARY LOADING [NIELINIOWA DYNAMIKA CIAL I POWLOK OSIOWOSYMETRYCZNYCH PODDANYCH DOWOLNYM OBCIAZENIOM]
Tran Duong Hien 1981 92 p refs In POLISH
(ISSN-0208-5658) Avail: Issuing Activity

A numerical analysis of serious deformations in orthotropic elastoplastic materials is presented. The analysis is conducted within the nonlinear model framework, allowing for both geometric and material nonlinearity to be considered. Applicaton of the semianalytic method of finite elements permits an analysis of problems connected with nonsymmetrical stressing. The use of four axisymmetric finite elements makes possible the calculation of both thin-walled and solid complex axisymmetric constructions. Transl. by J.D.

N83-12445# Cape Town Univ. (South Africa). Nonlinear Structural Mechanics Research Unit.
VIRTUAL WORK, MATERIAL INEQUALITIES AND VARIATIONAL PRINCIPLES IN STRUCTURAL MECHANICS
J. B. Martin Oct. 1981 23 p refs Presented at the Ann. Conf. of the South African Math. Soc., Port Elizabeth, South Africa, Oct. 1981
(TR-10) Avail: NTIS HC A02/MF A01

The general problem is set out, and the basic result which is referred to as the principle of virtual work is presented. The range of material behavior of interest is discussed and constitutive equations are written in terms of convex potential functions. A group of problems which are known as rigid plastic are emphasized. The limit theorems for static loading and results for dynamic loading are considered. S.L.

N83-12446# Cape Town Univ. (South Africa). Nonlinear Structural Mechanics Research Unit.
SOME COMMENTS ON CONVERGENCE ONTO MODE FORM

SOLUTIONS IN IMPULSIVELY LOADED PIECEWISE LINEAR RIGID-PLASTIC STRUCTURES
J. B. Martin Nov. 1981 29 p refs
(TR-11) Avail: NTIS HC A03/MF A01

Models in load and velocity space which illustrate the behavior of impulsively loaded piecewise linear rigid plastic structures are considered. The mode that a particular initial velocity field converges on or conversely, what initial velocity fields converge onto a particular mode are determined. The optimal time bound is determined with an algorithm for determining mode shapes. S.L.

N83-12447# Cape Town Univ. (South Africa). Nonlinear Structural Mechanics Research Unit.
SURFACE INSTABILITIES ON AN EQUIBIAXIALLY STRETCHED ELASTIC HALF-SPACE
B. D. Reddy Jul. 1981 31 p refs
(TR-7) Avail: NTIS HC A03/MF A01

The existence of nonhomogeneous modes of deformation in an equibiaxially stretched elastic half space is investigated. The surface of the half space is assumed to be traction free. It is shown that three different eigenmodal deformations are possible, according as the cube of the critical stretch is greater than, less than, or equal to 1/3. For the class of strain energy functons due to Ogden, necessary conditions for bifurcation are deduced for equibiaxial tension. Results are given and discussed for single-term, as well as two and three term Ogden strain energy functions, for equibiaxial tension and compression. S.L.

N83-12448# Cape Town Univ. (South Africa). Nonlinear Structural Mechanics Research Unit.
GEOMETRICALLY NONLINEAR MODE APPROXIMATIONS FOR IMPULSIVELY LOADED HOMOGENEOUS VISCOUS BEAMS AND FRAMES
P. D. Griffin and J. B. Martin Oct. 1981 26 p refs
(TR-6) Avail: NTIS HC A03/MF A01

Homogeneous viscous relations are used to model rigid visco plastic materials under impulsive loading conditions, and offer computational advantages because of their homogeneity and the absence of a rigid phase. The analysis of geometrically linear problems is extended to the practically more realistic case of structures undergoing large displacements. The instantaneous mode approximation technique is used, together with the implementation of an algorithm for the determination of the instantaneous mode shape. The method has particular advantages, because the determination of the mode shape is essentially a geometrically linear problem, all the nonlinearity appearing in the constant average acceleration forward integration technique. S.L.

N83-12449*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MATERIALS CONSTITUTIVE MODELS FOR NONLINEAR ANALYSIS OF THERMALLY CYCLED STRUCTURES
Albert Kaufman and Larry E. Hunt (Arizona Univ., Tucson) Oct. 1982 26 p refs
(Grant NAG3-45)
(NASA-TP-2055; E-1125; NAS 1.60:2055) Avail: NTIS HC A03/MF A01 CSCL 20K

Effects of inelastic materials models on computed stress-strain solutions for thermally loaded structures were studied by performing nonlinear (elastoplastic creep) and elastic structural analyses on a prismatic, double edge wedge specimen of IN 100 alloy that was subjected to thermal cycling in fluidized beds. Four incremental plasticity creep models (isotropic, kinematic, combined isotropic kinematic, and combined plus transient creep) were exercised for the problem by using the MARC nonlinear, finite element computer program. Maximum total strain ranges computed from the elastic and nonlinear analyses agreed within 5 percent. Mean cyclic stresses, inelastic strain ranges, and inelastic work were significantly affected by the choice of inelastic constitutive model. The computing time per cycle for the nonlinear analyses was more than five times that required for the elastic analysis. S.L.

N83-12450*# Boeing Aerospace Co., Seattle, Wash.
DESIGN, FABRICATION AND TEST OF GRAPHITE/POLYIMIDE COMPOSITE JOINTS AND ATTACHMENTS Data Report
J. B. Cushman, S. F. McCleskey, and S. H. Ward Jul. 1982 314 p refs
(Contract NAS1-15644)
(NASA-CR-165955; NAS 1.26:165955) Avail: NTIS HC A14/MF A01 CSCL 20K

The design, analysis, and testing performed to develop four types of graphite/polyimide (Gr/PI) bonded and bolted composite joints for lightly loaded control surfaces on advanced space transportation systems that operate at temperatures up to 561 K (550 F) are summarized. Material properties and small specimen tests were conducted to establish design data and to evaluate specific design details. Static discriminator tests were conducted on preliminary designs to verify structural adequacy. Scaled up specimens of the final joint designs, representative of production size requirements, were subjected to a series of static and fatigue tests to evaluate joint strength. Effects of environmental conditioning were determined by testing aged (125 hours at 589 K (600 F)) and thermal cycled (116 K to 589 K (-250 F to 600 F), 125 times) specimens. It is concluded Gr/PI joints can be designed and fabricated to carry the specified loads. Test results also indicate a possible resin loss or degradation of laminates after exposure to 589 K (600 F) for 125 hours. M.G.

N83-12451*# General Electric Co., Cincinnati, Ohio. Aircraft Engine Business Group.
BENCHMARK NOTCH TEST FOR LIFE PREDICTION
P. A. Domas, W. N. Sharpe, M. Ward, and J. F. Yau Oct. 1982 212 p refs Prepared in cooperation with Louisiana State Univ., Baton Rouge
(Contract NAS3-22522)
(NASA-CR-165571; NAS 1.26:165571; R82AEB358) Avail: NTIS HC A10/MF A01 CSCL 20L

The laser Interferometric Strain Displacement Gage (ISDG) was used to measure local strains in notched Inconel 718 test bars subjected to six different load histories at 649 C (1200 F) and including effects of tensile and compressive hold periods. The measurements were compared to simplified Neuber notch analysis predictions of notch root stress and strain. The actual strains incurred at the root of a discontinuity in cyclically loaded test samples subjected to inelastic deformation at high temperature where creep deformations readily occur were determined. The steady state cyclic, stress-strain response at the root of the discontinuity was analyzed. Flat, double notched uniaxially loaded fatigue specimens manufactured from the nickel base, superalloy Inconel 718 were used. The ISDG was used to obtain cycle by cycle recordings of notch root strain during continuous and hold time cycling at 649 C. Comparisons to Neuber and finite element model analyses were made. The results obtained provide a benchmark data set in high technology design where notch fatigue life is the predominant component service life limitation. S.L.

N83-12452*# Georgia Univ., Athens. Computer Software Management and Information Center.
TENTH NASTRAN USER'S COLLOQUIUM
Nov. 1982 273 p refs Colloq. held at New Orleans, 13-14 May 1982 Sponsored by NASA
(NASA-CP-2249; NAS 1.55:2249) Avail: NTIS HC A12/MF A01 CSCL 20K

The development of the NASTRAN computer program, a general purpose finite element computer code for structural analysis, was discussed. The application and development of NASTRAN is presented in the following topics: improvements and enhancements; developments of pre and postprocessors; interactive review system; the use of harmonic expansions in magnetic field problems; improving a dynamic model with test data using Linwood; solution of axisymmetric fluid structure interaction problems; large displacements and stability analysis of nonlinear propeller structures; prediction of bead area contact load at the tire wheel interface; elastic plastic analysis of an overloaded breech ring; finite element solution of torsion and other 2-D Poisson

equations; new capability for elastic aircraft airloads; usage of substructuring analysis in the get away special program; solving symmetric structures with nonsymmetric loads; evaluation and reduction of errors induced by Guyan transformation. For individual titles, see N83-12453 through N83-12469.

N83-12453*# Georgia Univ., Athens.
OPERATING IN THE AGE OF NASTRAN
Thomas G. Butler *In its* 10th NASTRAN User's Colloq. Nov. 1982 p 1-11 (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The history of the development of the NASTRAN computer program, a general purpose finite element code for structural analysis, is described. The need for research programs to improve analysis of structures, and the writing of a computer program to give numerical solutions for shell behavior, were the impetus for the program design. The use of finite elements to obtain engineering solutions was introduced. The architecture, solution structure, DMAP language, decomposition technique for banded matrices with active columns, general purpose plotter, engineering data inputs, elastic element routines, programmer manuals, of NASTRAN's system design are described. E.A.K.

N83-12454*# Computer Sciences Corp., El Segundo, Calif.
RECENT IMPROVEMENTS AND ENHANCEMENTS TO NASTRAN
P. R. Pamidi *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 12-17 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

Several improvements and enhancements recently made to NASTRAN are described. Some of the more important features are: streamlined rigid formats; improved rigid formats; changes related to plotting; checking of required PARAM bulk data cards; checkpoint/restart capability; unsorted and sorted bulk data deck echo; automatic output of the DMAP source listing; elimination of link switching caused by use of utility modules; paging the NASTRAN output; processing of mixed record data blocks by INPUT2/OUTPUT2 modules; module execute flag included in the OSCAR listing; and use of the multiple XDMAP cards in the DMAP. It is concluded that these changes increase the usefulness of the program. E.A.K.

N83-12455*# Georgia Univ., Athens.
RECENT DEVELOPMENTS OF NASTRAN PRE- AMD POST-PROCESSORS: RESPONSE SPECTRUM ANALYSIS (RESPAN) AND INTERACTIVE GRAPHICS (GIFTS)
Eric F. Hirt and Gary L. Fox *In its* 10th NASTRAN User's Colloq. Nov. 1982 p 19-44 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

Two specific NASTRAN preprocessors and postprocessors are examined. A postprocessor for dynamic analysis and a graphical interactive package for model generation and review of resuls are presented. A computer program that provides response spectrum analysis capability based on data from NASTRAN finite element model is described and the GIFTS system, a graphic processor to augment NASTRAN is introduced. E.A.K.

N83-12456*# Bridgeport Univ., Conn.
AN INTERACTIVE REVIEW SYSTEM FOR NASTRAN
Lawrence L. Durocher and Andrew F. Gasper (Hamilton Standard, Windsor Locks, Conn.) *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 45-64 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

An interactive review system that addresses the problems of model display, model error checking, and postprocessing is described. The menu driven system consists of four programs whose advantages and limitations are detailed. The interface between NASTRAN and MOVIE-BYU, the modifications required to make MOVIE usable in a finite element context, and the resulting capabilities of MOVIE as a graphics postprocessor for NASTRAN are illustrated. E.A.K.

N83-12457*# Naval Ship Research and Development Center, Bethesda, Md.
ON THE USE OF HARMONIC EXPANSIONS IN MAGNETIC FIELD PROBLEMS IN NASTRAN
Myles M. Hurwitz, Dolores R. Wallace, and Ernest W. Brooks *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 65-73 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The use of a prolate spheroidal harmonic expansion to compute far field results in magnetics problems with the DTNSRDC version of NASTRAN is demonstrated. When field problems with infinite exterior domains are solved by the finite element method, the domain must be modeled to infinity. The density of the finite element mesh usually decreases as the distance from the structure increases, thus degrading the results in the far field. E.A.K.

N83-12458*# Rockwell International Corp., Pittsburgh, Pa. Shuttle Orbiter Div.
IMPROVING A NASTRAN DYNAMIC MODEL WITH TEST DATA USING LINWOOD
B. H. Ujihara, M. M. Dosoky, and E. T. Tong *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 74-86 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The concept of expressing test modes as a linear combination of analytical modes was applied to the prediction of corrective terms in math model mass and stiffness. Test data for the Space Shuttle quarter scale solid rocket booster were analyzed by this method and significant improvements in frequency and mode shap correlation are noted. The applicability of the method is demonstrated. E.A.K.

N83-12459*# Naval Underwater Systems Center, New London, Conn.
SOLUTION OF AXISYMMETRIC FLUID STRUCTURE INTERACTION PROBLEMS WITH NASTRAN
A. J. Kalinowski and C. W. Nebelung *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 87-111 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The solution of axisymmetric acoustic fluid structure interaction problems, employing the NASTRAN computer program is presented. A previously developed 3-D Cartesian Coordinates pressure element formulation is adapted especially for axisymmetric elements. Analogous to the 3-D Cartesian Coordinate predecessor, the fluid portion of the problem is modeled with finite elements wherein one of the displacement components serves as a dummy variable for the pressure unknowns. Two alternatives for implementation of the analogy are presented: (1) an approximate method by which dummy values of G, and nu are used to approximately invoke the analogy wherein the accuracy of the approximation is made as close as desired to the proper analogy within an arbitrary small parameter epsiton; (2) an exact method whereby the NASTRAN FORTRAN coding is slightly changed to invoke the analogy exactly. Comparison of the finite element solution to the exact solution to the same problem is given. E.A.K.

N83-12460*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LARGE DISPLACEMENTS AND STABILITY ANALYSIS OF NONLINEAR PROPELLER STRUCTURES
Robert A. Aiello and Christos C. Chamis *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 112-132 (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The use of linear rigid formats in COSMIC NASTRAN without DMAP procedures for the analysis of nonlinear propeller structures is described. Approaches for updating geometry and applying follower forces for incremental loading are demonstrated. The COSMIC NASTRAN rigid formats and other independent finite

element programs are compared. The comparisons include results from the four approaches for updating the geometry using RIGID FORMAT 1, RIGID FORMATS 4 and 13, MARC and MSC/NASTRAN. It is shown that user friendly updating approaches can be used to predict the large displacements and instability of these nonlinear structures. The approaches are easily implemented by the user and predict conservative results. E.A.K.

N83-12461*# Goodrich (B. F.) Co., Akron, Ohio.
PREDICTION OF BEAD AREA CONTACT LOAD AT THE TIRE-WHEEL INTERFACE USING NASTRAN
C. H. S. Chen *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 133-142 ref (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The theoretical prediction of the bead area contact load at the tire wheel interface using NASTRAN is reported. The application of the linear code to a basically nonlinear problem results in excessive deformation of the structure and the tire-wheel contact conditions become impossible to achieve. A psuedo-nonlinear approach was adopted in which the moduli of the cord reinforced composite are increased so that the computed key deformations matched that of the experiment. Numerical results presented are discussed. E.A.K.

N83-12462*# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
ON ELASTIC-PLASTIC ANALYSIS OF AN OVERLOADED BREECH RING USING NASTRAN
P. C. T. Chen *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 143-152 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The piece-wise linear analysis option of the NASTRAN code was used to analyze a photoplastic model for a sliding breech mechanism. A two dimensional finite element representation for the breech ring was chosen and the material was made of polycarbonate resin. The aluminum block was regarded as rigid and the width of contact was assumed to remain unchanged during loading. The displacements and stresses in the breech ring were obtained for loading in the elastic as well as plastic range. The maximum tensile stresses before and after complete unloading were obtained and compared with numerical and experimental results. Author

N83-12463*# Naval Ship Research and Development Center, Bethesda, Md.
FINITE ELEMENT SOLUTION OF TORSION AND OTHER 2-D POISSON EQUATIONS
Gordon C. Everstine *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 153-164 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The NASTRAN structural analysis computer program may be used, without modification, to solve two dimensional Poisson equations such as arise in the classical Saint Venant torsion problem. The nonhomogeneous term (the right-hand side) in the Poisson equation can be handled conveniently by specifying a gravitational load in a 'structural' analysis. The use of an analogy between the equations of elasticity and those of classical mathematical physics is summarized in detail. Author

N83-12464*# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
A NEW CAPABILITY FOR ELASTIC AIRCRAFT AIRLOADS VIA NASTRAN
Hugh C. Briggs and Lance E. Chrisinger *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 165-186 (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

A new direct matrix abstract program for NASTRAN written to calculate internal stresses and airloads for a flexible wing is described. The difficulties encountered in interfacing the doublet lattice solution to the aerodynamic problem to the finite element solution to the structural problem are discussed. A brief numerical example is included. Author

N83-12465*# RPK Corp., Athens, Ga.
NASTRAN OF THE HEP
W. Keith Brown *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 187-203 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

Preliminary plans for the conversion of NASTRAN to DENELCOR's heterogeneous element processor (HEP) are presented. First, a brief history of computer architecture and the architecture of the HEP computer system are discussed. Second, a description of the HEP computer system is provided. Lastly, the preliminary NASTRAN conversion plans for link management, I/O management, memory management, and code optimization are discussed. Author

N83-12466*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE USAGE OF SUBSTRUCTURING ANALYSES IN THE GET AWAY SPECIAL (GAS) PROGRAM
Nelson J. Ferragut *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 204-215 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The use of automatic multi-stage substructing analysis is demonstrated for a hypothetical case of a GAS container supported by structural channels with a simulated experimental package inside the container. The GAS program purpose is stated and potential candidate structures to support experimental packages are discussed. The GAS container model and the substructuring analysis capabilities of NASTRAN make it possible to study the experiments inside the container as well as the design constraints resulting from the support structures holding the containers. The use of substructuring in the GAS program could be an important factor in increasing the number of flight opportunities. Author

N83-12467*# Georgia Univ., Athens.
USING NASTRAN TO SOLVE SYMMETRIC STRUCTURES WITH NONSYMMETRIC LOADS
Thomas G. Butler *In its* 10th NASTRAN User's Colloq. Nov. 1982 p 216-232 (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

A method for computation of reflective dihedral symmetry in symmetrical structures under nonsymmetric loads is described. The method makes it possible to confine the analysis to a half, a quarter, or an octagonal segment. The symmetry of elastic deformation is discussed, and antisymmetrical deformation is distinguished from nonsymmetrical deformation. Modes of deformation considered are axial, bending, membrane, and torsional deformation. Examples of one and two dimensional elements are presented and extended to three dimensional elements. The method of setting up a problem within NASTRAN is discussed. The technique is applied to a thick structure having quarter symmetry which was modeled with polyhedra and subjected to five distinct loads having varying degrees of symmetry. J.D.

N83-12468*# Georgia Univ., Athens.
EVALUATION AND REDUCTION OF ERRORS INDUCED BY THE GUYAN TRANSFORMATION
Gary L. Fox *In its* 10th NASTRAN User's Colloq. Nov. 1982 p 233-248 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The Guyan reduction refers to a method used to reduce the number of degrees of freedom in a structural model for dynamic analysis. Experience shows that, if the method is properly employed, then this reduction method does in fact provide a 'reasonably' accurate approximation of the dynamic characteristics of the unreduced model. A method that provides an accurate estimate of the error in each mode of the reduced eigenvalue

problem and, in addition, gives first order correction terms that greatly improve the accuracy of the eigenvectors and eigenvalues is presented. The method is demonstrated by standard COSMIC NASTRAN DAMP alters to rigid format 3, real normal mode analysis. Comparative computer time of modal extraction versus error analysis is discussed for the VAX-11/780 version of COSMIC NASTRAN. Author

N83-12469*# Computer Sciences Corp., El Segundo, Calif.
ON RESTARTS IN NASTRAN
P. R. Pamidi and M. M. Lin *In* Georgia Univ. 10th NASTRAN User's Colloq. Nov. 1982 p 249-267 refs (For primary document see N83-12452 03-39)
Avail: NTIS HC A12/MF A01 CSCL 20K

The checkpoint/restart capability available in NASTRAN is very sophisticated. Improvements and enhancements to this capability made with a view to increasing its efficiency and usefulness are considered. Some important features resulting from these changes are discussed. In particular, the different types of restarts available in NASTRAN are described and how they are handled both in the rigid format and DMAP environments explained. The output to restart runs are also illustrated. Author

N83-12470# National Bureau of Standards, Washington, D.C.
MECHANICAL PROPERTIES OF CONCRETE MORTAR AT LOW TEMPERATURES
J. M. Arvidson, L. L. Sparks, and E. Steketee Feb. 1982 10 p (PB82-185125; NBSIR-82-1658) Avail: NTIS HC A01/MF A01 CSCL 13C

Test results conducted at ambient (295 K), dry-ice and alcohol (195 K), liquid nitrogen (76 K), and liquid helium (4 K) temperatures are reported. The compressive properties reported are Young's modulus, yield (at 0.2% offset) and maximum strengths, and elongation (elastic and plastic). Test specimens (5.1 cm diameter x 10.2 cm) were instrumented with a specially designed, diametrically opposed, cryogenic strain-gaged extensometer that minimizes possible errors due to specimen bending during the test. Author (GRA)

N83-12471# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
INSTRUCTIONS FOR TI-59 COMBINED CARD/MODULE CALCULATIONS FOR IN-PLANE AND FLEXURAL PROPERTIES OF SYMMETRIC LAMINATES: REVISED Final Technical Report
Steven L. Donaldson Jun. 1982 130 p
(AF Proj. 2419)
(AD-A117869; AFWAL-TR-82-4081) Avail: NTIS HC A07/MF A01 CSCL 11/4

This report is an updated and expanded version of AFWAL-TR-81-4116. It contains descriptions and step-by-step instructions for the simple, combined use of magnetic cards with the composite materials module, designed for use in TI-59 programmable calculators. Users do not have to be familiar with TI-59 programming. These programs contain the key calculations of the stiffness and strength of unidirectional and symmetrically laminated composites, including sandwich core laminates. Both in-plane and flexural loadings can be applied, giving in-plane and flexural response. Instant calculations can be made for practical use. With the use of a printer, the results can be immediately and permanently recorded. The equation numbers in this report are from Introduction to Composite Materials by Tsai and Hahn, published by Technomic Publishing Company, Westport, Connecticut, July 1980. Author (GRA)

N83-12472# Massachusetts Univ., Amherst. Dept. of Civil Engineering.
RESPONSE OF THICK CYLINDRICAL SHELLS TO TRANSIENT INTERNAL LOADINGS Final Technical Report, 1 Feb. 1977 - 31 Dec. 1981
Takeshi Han-Ura and William A. Nash Aug. 1982 105 p refs
(Grant DAAG29-77-G-0095)
(AD-A118600; ARO-14700.2-EG) Avail: NTIS HC A06/MF A01 CSCL 20/14

The case of wave propagation in a thick-walled elastic cylindrical shell subject to dynamically applied internal pressure is examined for various shell geometries and modes of application of the internal loading. Shells of both infinite as well as semi-infinite length are treated. In both cases the loading is considered to be axisymmetric. The investigation culminates in the determination of dynamic behavior of the thick shell subject to a band of constant intensity pressure moving at constant velocity along the inner surface of the shell. Displacement and strain components at any point in the shell may be evaluated in terms of dimensionless variables from the computer program presented. Author (GRA)

N83-12473# Hughes (Thomas J. R.), Stanford, Calif.
STRESSPOINT ALGORITHM FOR A PRESSURE-SENSITIVE MULTIPLE-YIELD-SURFACE PLASTICITY THEORY
Thomas J. R. Hughes Mar. 1982 43 p refs
(Contract W-7405-eng-48)
(DE82-013922; UCID-19339) Avail: NTIS HC A03/MF A01

A pressure-sensitive multiple-yield-surface plasticity theory is presented for application to the multi-dimensional cyclic response of soil media. A stress-point numerical algorithm is developed as the basis of a computer module designed to interface with large-scale finite element computer programs used at LLNL. DOE

N83-12474# Illinois Univ., Urbana.
INFLUENCE OF STIRRUP-TIE SHAPE ON INELASTIC CYCLIC RESPONSE OF FLANGED REINFORCED CONCRETE FLEXURAL MEMBERS
Dale R. Wilhelm and Charles F. Scribner Aug. 1981 80 p refs (PB82-184763; UILU-ENG-81-2012; SRS-493) Avail: NTIS HC A05/MF A01 CSCL 13C

Three reinforced concrete flanged sections (T-sections) having different shapes of shear reinforcement were subjected to cyclic inelastic flexure representative of what framed structure members might be forced to endure during a severe earthquake. The different types of shear reinforcement consisted of closed hoops and two types of U-shaped stirrups, neither having been supplemented with cap ties. The experimental work is documented, data obtained during tests (including energy dissipation capacities) are presented, and the implications of test results on possible changes in reinforcement details for frame structures in seismic regions are discussed. GRA

N83-12475# Louisiana State Univ., Baton Rouge. Dept. of Civil Engineering.
PERFORMANCE TESTS OF FULL SPAN FORM BRIDGES Final Report, Jan. - Jul. 1981
C. Dale Buckner and H. T. Turner Aug. 1981 89 p refs Prepared in cooperation with the Louisiana Department of Transportation and Development
(PB82-183039; FHWA/RD-81/S01193) Avail: NTIS HC A05/MF A01 CSCL 13B

The effects of repetitive loading on the serviceability and strength of full span composite panel form bridges were determined using six simply supported bridge decks consisting of three precast, pretensioned panels composite with a cast-in-place topping slab. Bond between the topping slab and the roughened interface surfaces of the panels provided the only means of shear connection. The topping slab thickness, panel joint type (flat or beveled-edge), and the effect of longitudinal cracks in the topping slab were conidered. The specimens were loaded repetitively with 2,000,000 cycles of design load. The loading arrangement was such that maximum transverse shear stresses and maximum longitudinal bending stresses were produced during each cycle. Performance was evaluated primarily on the basis of flexural rigidity, differential deflection between panels, and the strength and ductility of the composite system. Visible cracks in the concrete, extension of prestressing strands and strains in transverse steel were also considered in evaluating the specimens. GRA

N83-12476# Woods Hole Oceanographic Institution, Mass.
MULTICHANNEL MAXIMUM ENTROPY METHOD OF SPECTRAL ANALYSIS APPLIED TO OFFSHORE STRUCTURES

O.E. Thesis
Michael Jeffrey Briggs Aug. 1981 174 p refs
(Contract DI-14-08-001-17202)
(PB82-182676; WHOI-81-69) Avail: NTIS HC A08/MF A01 CSCL 13B

The multichannel maximum entropy method (MEM) of spectral analysis is developed and applied in the dynamic analysis of offshore structures. Two different algorithms are implemented and compared with the conventional Blackman-Turkey method. These are (1) a direct on the data or Burg method and (2) a Yule-Walker or correlation function extension method. Cross spectral estimates of magnitude, phase, coherence squared, and transfer function are calculated. These estimates are then used in mode shape identification of a triple decked, single caisson offshore platform. The superiority of the multichannel maximum entropy methods relative to conventional spectral analysis techniques in calculating these cross spectral estimates and evaluating mode shapes is demonstrated. Author (GRA)

N83-12477# Texas Univ., Austin. Center for Transportation Research.
FIELD TESTS OF A CONTINUOUS TWIN GIRDER STEEL BRIDGE Interim Report
J. A. Yura, K. H. Frank, and A. K. Gupta Nov. 1981 118 p refs
(PB82-185901; FHWA/TX-81/38; RR-247-2; CTR-3-5-79-247-2) Avail: NTIS HC A06/MF A01 CSCL 13M

The structural behavior of a twin girder continuous steel bridge was studied in the field to provide data for a fatigue evaluation of the structure. Girder strains and deflections were measured under normal traffic and with a 52,000 lb test truck traveling at various speeds up to 50 mph using high speed data acquisition equipment. An analysis of the data showed a maximum flange stress range of 3.1 ksi due to the test truck. A structural analysis of the bridge gave theoretical results which were within 10 percent of the measured flange stresses. Experimental data with the truck at high speed were more reliable than data with the truck stationary. Author (GRA)

N83-12478# National Timber Research Inst., Pretoria (South Africa).
SECONDARY STRESSES CAUSED BY LAPPED JOINTS
F. R. P. Pienaar 1980 22 p Presented at the Meeting of Subject Group S5.02 of IUFRO Division 5, Oxford, Apr. 1980
(PB82-206871) Avail: NTIS HC A02/MF A01 CSCL 13M

According to tests done on full-scale trusses, trusses with lapped joints are weaker than trusses with all members in the same plane. This is mainly due to the bending moments caused by joint eccentricity. It can be shown by simple analysis that for a simple symmetric rectangular member with a lapped joint that bending stress due to eccentricity alone is equal to the axial force divided by cross-sectional area of member. This stress due to eccentricity theoretically appears to be very high. The purpose of this experiment is to check whether the mathematical model used is sound or not. GRA

N83-12479# Sydney Univ. (Australia). Civil Engineering Lab.
SHEAR IN COMPOSITE BEAM-TO-COLUMN CONNECTIONS
P. Ansourian Jun. 1981 38 p refs
(PB82-187246) Avail: NTIS HC A03/MF A01 CSCL 13M

The behavior of composite columns under the action of connection shear in the zone of intersection with beams is studied. The columns are of encased 1 section or of square tube filled with concrete, and the beams of either steel 1 section or composite T section. Expressions are derived to predict the shear deformation in the initial elastic range, in the cracked range and in the post yielded range. Connection flexibility coefficients in the plastic range are given in a form suitable for nonlinear matrix frame analysis. GRA

42 GEOSCIENCES (GENERAL)

N83-12480# Department of Energy, Washington, D. C. Office of Basic Energy Sciences.
SUMMARY OUTLINE OF DOE GEOSCIENCE AND GEOSCIENCE RELATED RESEARCH
Feb. 1982 110 p
(DE82-008203; DOE/ER-0120) Avail: NTIS HC A06/MF A01

The long range, basic research in the areas of the geosciences relevant to the nation's energy needs are discussed. The geoscience program develops a quantitative and predictive understanding of geological, geophysical and geochemical structures and processes in the solid earth and in solar terrestrial relationships. An effective knowledge base for energy resurce recognition, evaluation and utilization in an enviromentally acceptable manner is proposed. Principal areas of interest include: geology, geophysics, and Earth dynamics; geochemistry; energy resource recognition, evaluation and utilization; hydrologic and marine sciences and solar terrestrial/atmospheric interactions. DOE

N83-12481# World Meteorological Organization, Geneva (Switzerland). Executive Committee Panel of Experts on Education and Training.
ADDENDUM TO GUIDELINES FOR THE EDUCATION AND TRAINING OF PERSONNEL IN METEOROLOGY AND OPERATIONAL HYDROLOGY. PART 2: EDUCATION AND TRAINING OF PERSONNEL IN OPERATIONAL HYDROLOGY
1982 42 p
(WMO-258) Avail: NTIS MF A01; print copy available at WMO, Geneva

Curricula for the education and training of professional hydrologists and hydrological technicians are presented. At the end of the course professional hydrologists should be capable of hydrological service management, design of water resource projects, data analysis, research, and training. Technicians training covers measuring, data processing, equipment installation and supervising the work of hydrological observers (who are trained on the job to make observations and keep records). The curricula cover mathematics, physics, operational hydrology, meteorology, and management. Author (ESA)

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-12482*# Agricultural Research Service, Pullman, Wash.
INFLUENCE OF ENVIRONMENTAL FACTORS DURING SEED DEVELOPMENT AND AFTER FULL-RIPENESS ON PREHARVEST SPROUTING IN WHEAT
A. J. Ciha, H. Murray (Washington State Univ., Pullman), M. G. Hagemann (Washington State Univ., Pullman), and W. A. Goldstein, Principal Investigators Jun. 1982 43 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10002; NASA-CR-169493; EW-U2-04319; JSC-18254; NAS 1.26:169493) Avail: NTIS HC A03/MF A01 CSCL 02C

Results on environmental and genotypic factors influencing preharvest sprouting of wheat are summarized. Other possible areas where additional research is needed is suggested. A.R.H.

N83-12483*# Missouri Univ., Columbia.
SECOND GENERATION CROP YIELD MODELS REVIEW
Tom Hodges, Principal Investigator Mar. 1982 37 p refs Prepared in cooperation with Dept. of Agriculture, Columbia, Mo. Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and

Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10003; NASA-CR-169492; YM-12-04306; JSC-18245) Avail: NTIS HC A03/MF A01 CSCL 02C

Second generation yield models, including crop growth simulation models and plant process models, may be suitable for large area crop yield forecasting in the yield model development project. Subjective and objective criteria for model selection are defined and models which might be selected are reviewed. Models may be selected to provide submodels as input to other models; for further development and testing; or for immediate testing as forecasting tools. A plant process model may range in complexity from several dozen submodels simulating (1) energy, carbohydrates, and minerals; (2) change in biomass of various organs; and (3) initiation and development of plant organs, to a few submodels simulating key physiological processes. The most complex models cannot be used directly in large area forecasting but may provide submodels which can be simplified for inclusion into simpler plant process models. Both published and unpublished models which may be used for development or testing are reviewed. Several other models, currently under development, may become available at a later date. Author

N83-12484*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
PERFORMANCE COMPARISON FOR BARNES MODEL 12-1000, EXOTECH MODEL 100, AND IDEAS INC. BIOMETER MARK 2
Barrett Robinson, Principal Investigator 22 Apr. 1981 32 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E83-10004; NASA-CR-167646; SR-P1-04090; NAS 1.26:167646) Avail: NTIS HC A03/MF A01 CSCL 02C

Results of tests show that all channels of all instruments, except channel 3 of the Biometer Mark 2, were stable in response to input signals were linear, and were adequately stable in response to temperature changes. The Biometer Mark 2 is labelled with an inappropriate description of the units measured and the dynamic range is a inappropriate for field measurements causing unnecessarily high fractional errors. This instrument is, therefore, quantization limited. The dynamic range and noise performance of the Model 12-1000 are appropriate for remote sensing field research. The field of view and performance of the Model 100A and the Model 12-1000 are satisfactory. The Biometer Mark 2 has not, as yet, been satisfactorily equipped with an acceptable field of view determining device. Neither the widely used aperture plate nor the 24 deg cone are acceptable. A.R.H.

N83-12485*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
A THREE-PART GEOMETRIC MODEL TO PREDICT THE RADAR BACKSCATTER FROM WHEAT, CORN, AND SORGHUM
Fawwaz T. Ulaby, Principal Investigator, G. W. Eger, III, and E. T. Kanemasu Apr. 1982 211 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15421; Proj. AgRISTARS)
(E83-10005; NASA-CR-167713; SR-K2-04313; RSL-TR-360-18) Avail: NTIS HC A10/MF A01 CSCL 02C

A model to predict the radar backscattering coefficient from crops must include the geometry of the canopy. Radar and ground-truth data taken on wheat in 1979 indicate that the model must include contributions from the leaves, from the wheat head, and from the soil moisture. For sorghum and corn, radar and ground-truth data obtained in 1979 and 1980 support the necessity of a soil moisture term and a leaf water term. The Leaf Area Index (LAI) is an appropriate input for the leaf contribution to the radar response for wheat and sorghum, however the LAI generates less accurate values for the backscattering coefficient for corn. Also, the data for corn and sorghum illustrate the importance of the water contained in the stalks in estimating the radar response. Author

N83-12486*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
AGRISTARS. SEMIANNUAL PROGRAM REVIEW PRESENTATION TO LEVEL 1, INTERAGENCY COORDINATION COMMITTEE
15 Apr. 1982 104 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10006; NASA-TM-84878; ITJ2-04267; JSC-17830; NAS 1.15:84878) Avail: NTIS HC A06/MF A01 CSCL 02C

Results are presented for (1) spring small grains; (2) summer crops/corn and soybeans; and (3) crop signature characterization. The development of an early season approach, profile and segment based change estimation, and future satellite and sensor system requirements are discussed. Documentation for the inventory technology development project is included. A.R.H.

N83-12487*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
EVALUATION OF SMALL AREA CROP ESTIMATION TECHNIQUES USING LANDSAT- AND GROUND-DERIVED DATA Final Report, 1980 - 1981
M. L. Amis, M. V. Martin, W. G. McGuire, and S. S. Shen, Principal Investigators Aug. 1982 146 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800)
(E83-10008; NASA-CR-167752; DC-L2-04264; JSC-17829; NAS 1.26:167752; LEMSCO-17597) Avail: NTIS HC A07/MF A01 CSCL 02C

Studies completed in fiscal year 1981 in support of the clustering/classification and preprocessing activities of the Domestic Crops and Land Cover project. The theme throughout the study was the improvement of subanalysis district (usually county level) crop hectarage estimates, as reflected in the following three objectives: (1) to evaluate the current U.S. Department of Agriculture Statistical Reporting Service regression approach to crop area estimation as applied to the problem of obtaining subanalysis district estimates; (2) to develop and test alternative approaches to subanalysis district estimation; and (3) to develop and test preprocessing techniques for use in improving subanalysis district estimates. Author

N83-12488*# Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
DISCRIMINATION OF GROWTH AND WATER STRESS IN WHEAT BY VARIOUS VEGETATION INDICES THROUGH A CLEAR A TURBID ATMOSPHERE
R. D. Jackson, P. M. Slater, and P. J. Pinter, Principal Investigators May 1982 44 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10009; NASA-CR-169491; EW-U2-04298; JSC-18241; NAS 1.26:169491) Avail: NTIS HC A03/MF A01 CSCL 02C

Reflectance data were obtained over a drought-stressed and a well-watered wheat plot with a hand-held radiometer having bands similar to the MSS bands of the LANDSAT satellites. Data for 48 clear days were interpolated to yield reflectance values for each day of the growing season, from planting until harvest. With an atmospheric path radiance model and LANDSAT-2 calibration data, the reflectance were used to simulate LANDSAT digital counts (not quantized) for the four LANDSAT bands for each day of the growing season, through a clear (approximately 100 km meteorological range) and a turbid (approximately 10 km meteorological range) atmosphere. Several ratios and linear combinations of bands were calculated using the simulated data, then assessed for their relative ability to discriminate vegetative growth and plant stress through the two atmospheres. The results show that water stress was not detected by any of the indices until after growth was retarded, and the sensitivity of the various indices to vegetation depended on plant growth stage and atmospheric path radiance. Author

N83-12489*# Department of Agriculture, Houston, Tex.
OPTICAL PARAMETERS OF LEAVES OF SEVEN WEED SPECIES
H. W. Gausman, R. M. Menges, A. J. Richardson, H. Walter, R. R. Rodriguez, and S. Tamez, Principal Investigators Jun. 1982 9 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS (Proj. AgRISTARS)
(E83-10010; NASA-CR-169490; EW-U2-04328; JSC-18259; NAS 1.26:169490) Avail: NTIS HC A02/MF A01 CSCL 02C

The absorption coefficient (k), infinite reflectance (R), and scattering coefficient (s) were tabulated for five wavelengths and analyzed for statistical differences for seven weed species. The wavelengths were: 0.55-micrometer, 0.65-micrometers, 0.85-micrometer, 1.65-micrometers, and 2.20-micrometer. The R of common lambsquarters (Chenopodium album L.), Johnsongrass (Sorghum halepense (L.) Pers.), and annual sowthistle (Sonchus oleraceus L.) leaves at the 0.85-micrometer wavelength were significantly ($p=0.05$) higher than for sunflower (Heliantus annus L.), ragweed parthenium (Parthenium hysterophorus L.), or London rocket (Sisymbrium irio L.). Annual sowthistle had the largest k value, and Plamer amaranth (Amaranthus palmer S. Wats.) had the smallest k value at the 0.65 approximately chlorophyll absorption wavelength. In general, john-songress, ragweed parthenium, or London rocket had the largest s values among the five wavelengths, wereas annual sowthistle and plamar amaranth were usually lowest. Author

N83-12490*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
OPERATION PLAN FOR THE DATA 100/LARS TERMINAL SYSTEM
A. J. Bowen, Jr. Jul. 1980 23 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10011; NASA-CR-167754; JSC-16747; NAS 1.26:167754; LEMSCO-15128) Avail: NTIS HC A02/MF A01 CSCL 09B

The Data 100/LARS terminal system provides an interface for processing on the IBM 3031 computer system at Purdue University's Laboratory for Applications of Remote Sensing. The environment in which the system is operated and supported is discussed. The general support responsibilities, procedural mechanisms, and training established for the benefit of the system users are defined. A.R.H.

N83-12491*# Arkansas Univ., Fayetteville. Dept. of Electrical Engineering.
MEASUREMENT OF SOIL MOISTURE USING REMOTE SENSING MULTISENSOR RADIATION TECHNIQUES Final Report
W. P. Waite, Principal Investigator May 1982 12 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-14251; Proj. AgRISTARS)
(E83-10012; NASA-CR-167648; SM-A2-04322; NAS 1.26:167648) Avail: NTIS HC A02/MF A01 CSCL 02C

Theoretical modeling as well as laboratory and field measurement were coupled with analysis of aircraft data obtained from controlled sites in an effort to enhance understanding of the microwave response due to soil moisture so as to specify sensor parameters and develop inversion algorithms. Models to predict the complex dielectric constant were produced which led to the interpretation of the results in terms of a matrix potential rather than simply moisture content. Similar advances were made in the development of coherent and incoherent radiative transfer models and rough surface scattering models. A.R.H.

N83-12492*# Department of Agriculture, Sydney, Mont.
WINTER WHEAT STAND DENSITY DETERMINATION AND YIELD ESTIMATES FROM HANDHELD AND AIRBORNE SCANNERS
J. K. Aase, J. P. Millard, and F. H. Siddoway, Principal Investigators Jun. 1982 20 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Proj. AgRISTARS)
(E83-10013; NASA-CR-169489; EW-U2-04327; JSC-18258) Avail: NTIS HC A02/MF A01 CSCL 02C

Radiance measurements from handheld (Exotech 100-A) and air-borne (Daedalus DEI 1260) radiometers were related to wheat (Triticum aestivum L.) stand densities (simulated winter wheat winterkill) and to grain yield for a field located 11 km northwest of Sidney, Montana, on a Williams loam soil (fine-loamy, mixed Typic Argiborolls) where a semidwarf hard red spring wheat cultivar was needed to stand. Radiances were measured with the handheld radiometer on clear mornings throughout the growing season. Aircraft overflight measurements were made at the end of tillering and during the early stem extension period, and the mid-heading period. The IR/red ratio and normalized difference vegetation index were used in the analysis. The aircraft measurements corroborated the ground measurements inasmuch as wheat stand densities were detected and could be evaluated at an early enough growth stage to make management decision. The aircraft measurements also corroborated handheld measurements when related to yield prediction. The IR/red ratio, although there was some growth stage dependency, related well to yield when measured from just past tillering until about the watery-ripe stage. Author

N83-12493*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
DEVELOPMENT OF A CORN AND SOYBEAN LABELING PROCEDURE FOR USE WITH PROFILE PARAMETER CLASSIFICATION
E. R. Magness, Principal Investigator Jun. 1982 184 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10014; NASA-CR-167720; SR-L2-00750; JSC-18257; NAS 1.26:167720; LEMSCO-17765) Avail: NTIS HC A09/MF A01 CSCL 02C

Some essential processes for the development of a green-number-based logic for identifying (labeling) crops in LANDSAT imagery are documented. The supporting data and subsequent conclusions that resulted from development of a specific labeling logic for corn and soybean crops in the United States are recorded. Author

N83-12494*# Texas A&M Univ., College Station. Dept. of Mathematics.
DEVELOPMENT OF ADVANCED ACREAGE ESTIMATION METHODS Final Report, 1 Nov. 1980 - 30 Jun. 1982
L. F. Guseman, Jr., Principal Investigator Jun. 1982 275 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of Interior, and Agency for International Development ERTS
(Contract NAS9-14689; Proj. AgRISTARS)
(E83-10015; NASA-CR-167701; SR-T2-04371; NAS 1.26:167701) Avail: NTIS HC A12/MF A01 CSCL 05B

The development of an accurate and efficient algorithm for analyzing the structure of MSS data, the application of the Akaiki information criterion to mixture models, and a research plan to delineate some of the technical issues and associated tasks in the area of rice scene radiation characterization are discussed. The AMOEBA clustering algorithm is refined and documented. For individual titles, see N83-12495 through N83-12498.

N83-12495*# Texas A&M Univ., College Station.
SYSTEM SUPPORT DOCUMENTATION: IDIMS FUNCTION AMOEBA Final Report
Jack Bryant *In its* Develop. of Advan. Acreage Estimation Methods Jun. 1982 189 p ERTS (For primary document see N83-12494 03-43)
Avail: NTIS HC A12/MF A01 CSCL 05B

A listing is provided for AMOEBA, a clustering program based on a spatial-spectral model for image data. The program is fast

and automatic (in the sense that no parameters are required), and classifies each picture element into classes which are determined internally. As an IDIMS function, no limit on the size of the image is imposed. Author

N83-12496*# Texas A&M Univ., College Station. Remote Sensing Center.
RICE SCENE RADIATION RESEARCH PLAN Final Report
James Heilman *In its* Develop. of Advan. Acreage Estimation Methods Jun. 1982 12 p ERTS (For primary document see N83-12494 03-43)
Avail: NTIS HC A12/MF A01 CSCL 05B

Data requirements, tasks to be accomplished, and the technical approaches to be used in identifying the characteristics of rice for crop inventories are listed as well as methods for estimating crop development and assessing its conditions. A.R.H.

N83-12497*# Houston Univ., Tex. Dept. of Mathematics.
THE POSSIBLE MODIFICATIONS OF THE HISSE MODEL FOR PURE LANDSAT AGRICULTURAL DATA
Charles Peters *In* Texas A and M Univ. Develop. of Advan. Acreage Estimation Methods Jun. 1982 14 p refs ERTS (For primary document see N83-12494 03-43)
(Contract NAS9-14689)
Avail: NTIS HC A12/MF A01 CSCL 05B

An idea, due to A. Feiveson, is presented for relaxing the assumption of class conditional independence of LANDSAT spectral measurements within the same patch (field). Theoretical arguments are given which show that any significant refinement of the model beyond Feiveson's proposal will not allow the reduction, essential to HISSE, of the pure data to patch summary statistics. A slight alteration of the new model is shown to be a reasonable approximation to the model which describes pure data elements from the same patch as jointly Gaussian with a covariance function which exhibits exponential decay with respect to spatial separation. Author

N83-12498*# Tulsa Univ., Okla. Div. of Mathematical Sciences.
THE AKAIKE INFORMATION CRITERION AND ITS APPLICATION TO MIXTURE PROPORTION ESTIMATION Final Report
Richard A. Redner, Genshiro Kitagawa, and William A. Coberly *In* Texas A and M Univ. Develop. of Advan. Acreage Estimation Methods Jun. 1982 48 p refs ERTS (For primary document see N83-12494 03-43)
(Contract NAS9-14689)
Avail: NTIS HC A12/MF A01 CSCL 05B

The theory and applications of the Akaike information criterion (AIC) Mixture model simulations and the application of the AIC to a large portion of a LANDSAT segment are presented. A.R.H.

N83-12499*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
DATA DOCUMENTATION FOR THE 1981 SUMMER VEGETATION EXPERIMENT Interim Report
Fawwaz T. Ulaby, Principal Investigator, Brian Brisco, and Christopher Allen May 1982 117 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15421; Proj. AgRISTARS)
(E83-10016; NASA-CR-167718; SR-K2-04336; NAS 1.26:167718)
Avail: NTIS HC A06/MF A01 CSCL 02C

The mobile agricultural radar sensor was used to collect data from 31 fields in the floodplain of the Kansas River east of Lawrence, Kansas during the summer of 1981. Corn, soybeans, and wheat crops were observed from May 1 to November 11. Radar backscattering measurements were acquired at 10.2 GHz for VV and VH polarizations at 50 deg incidence angles for all fields and at 30 deg, 40 deg, 50 deg, 60 deg, and 70 deg for nine of the 31 fields. Target parameters describing the vegatation and soil characteristics, such as plant moisture, plant height, soil moisture, etc., were also measured. The methodology, radar backscatter data and associated ground-truth data obtained during this experiment are documented. Author

N83-12500*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
DEVELOPMENT, IMPLEMENTATION AND EVALUATION OF SATELLITE-AIDED AGRICULTURAL MONITORING SYSTEMS Semiannual Report
R. Cicone, E. P. Crist, M. Metzler, and D. Nuesch Jun. 1982 58 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS9-16538; Proj. AgRISTARS)
(E83-10017; NASA-CR-167702; IT-E2-04311; ERIM-160300-18-P)
Avail: NTIS HC A04/MF A01 CSCL 02C

Research activities in support of AgRISTARS Inventory Technology Development Project in the use of aerospace remote sensing for agricultural inventory described include: (1) corn and soybean crop spectral temporal signature characterization; (2) efficient area estimation techniques development; and (3) advanced satellite and sensor system definition. Studies include a statistical evaluation of the impact of cultural and environmental factors on crop spectral profiles, the development and evaluation of an automatic crop area estimation procedure, and the joint use of SEASAT-SAR and LANDSAT MSS for crop inventory. A.R.H.

N83-12501*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
ANALYSIS OF THE PROFILE CHARACTERISTICS OF CORN AND SOYBEANS USING FIELD REFLECTANCE DATA Technical Report, 1 Jan. - 31 May 1982
E. P. Crist Jun. 1982 52 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-16538; Proj. AgRISTARS)
(E83-10018; NASA-CR-167729; IT-E2-04310; NAS 1.26:167729; ERIM-160300-19-T) Avail: NTIS HC A04/MF A01 CSCL 02C

The typical patterns of spectral development (profiles) for corn and soybeans are presented, based on field-collected reflectance data transformed to correspond to LANDSAT-MSS Tasseled Cap coordinates. Reasonable variations in field conditions and cultural practices are shown to significantly influence profile features. The separability of the two crops is determined to be primarily related to the maximum value of the reflectance equivalent of Greenness, and to the plateau effect seen in corn Greenness profiles. The impact of changes in conditions on separability is described. In addition, association is made between profile features and stages of development for corn and soybeans. Corn is shown to peak at a stage well before tasseling or maximum LAI, while the characteristics of the soybean profile are shown to be unrelated to any particular stage of development. Author

N83-12502*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex. Experiment Support Dept.
AGRISTARS DOCUMENTS TRACKING LIST REPORT
J. L. Hawkins Jun. 1982 90 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10019; NASA-CR-167728; AP-L2-04116; NAS 1.26:167728)
Avail: NTIS HC A05/MF A01 CSCL 05B

A quarterly listing of those documents and related publications that have been issued and placed in the AgRISTARS tracking system is presented. The Tracking List Report provides a catalog, by project, of technical publications arranged by type of document and gives the reference AgRISTARS document numbers, title and date of publication, the issuing organization, and the National Technical Information Service reference number. Author

N83-12503*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
ASSESSMENT OF RADAR RESOLUTION REQUIREMENTS FOR SOIL MOISTURE ESTIMATION FROM SIMULATED SATELLITE IMAGERY
Fawwaz T. Ulaby, Principal Investigator, M. C. Dobson, and S.

Moezzi Aug. 1982 109 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS9-16419; Proj. AgRISTARS)
(E83-10020; NASA-CR-167748; SM-K2-04356; NAS 1.26:167748; RSL-TR-551-2) Avail: NTIS HC A06/MF A01 CSCL 08M

Radar simulations were performed at five-day intervals over a twenty-day period and used to estimate soil moisture from a generalized algorithm requiring only received power and the mean elevation of a test site near Lawrence, Kansas. The results demonstrate that the soil moisture of about 90% of the 20-m by 20-m pixel elements can be predicted with an accuracy of + or - 20% of field capacity within relatively flat agricultural portions of the test site. Radar resolutions of 93 m by 100 m with 23 looks or coarser gave the best results, largely because of the effects of signal fading. For the distribution of land cover categories, soils, and elevation in the test site, very coarse radar resolutions of 1 km by 1 km and 2.6 km by 3.1 km gave the best results for wet moisture conditions while a finer resolution of 93 m by 100 m was found to yield superior results for dry to moist soil conditions. A.R.H.

N83-12504*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
EXTENSION OF LABORATORY-MEASURED SOIL SPECTRA TO FIELD CONDITIONS
E. R. Stoner, M. F. Baumgardner, R. A. Weismiller, L. L. Biehl, and B. F. Robinson Jun. 1982 7 p refs Repr. from Soil Sci. Soc. Am. J., v. 44, 1980 p 572-574 Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E83-10021; NASA-CR-167722; SR-P2-04326; LARS-052680) Avail: NTIS HC A02/MF A01 CSCL 08M

Spectral responses of two glaciated soils, Chalmers silty clay loam and Fincastle silt loam, formed under prairie grass and forest vegetation, respectively, were measured in the laboratory under controlled moisture equilibria using an Exotech Model 20C spectroradiometer to obtain spectral data in the laboratory under artificial illumination. The same spectroradiometer was used outdoors under solar illumination to obtain spectral response from dry and moistened field plots with and without corn residue cover, representing the two different soils. Results indicate that laboratory-measured spectra of moist soil are directly proportional to the spectral response of that same field-measured moist bare soil over the 0.52 micrometer to 1.75 micrometer wavelength range. The magnitudes of difference in spectral response between identically treated Chalmers and Fincastle soils are greatest in the 0.6 micrometers to 0.8 micrometer transition region between the visible and near infrared, regardless of field condition or laboratory preparation studied. Author

N83-12505*# Texas A&M Univ., College Station. Inst. of Statistics.
MISSING OBSERVATIONS IN MULTIYEAR ROTATION SAMPLING DESIGNS
E. E. Gbur and R. L. Sielken, Jr., Principal Investigators Jun. 1982 125 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-14689; Proj. AgRISTARS)
(E83-10022; NASA-CR-167700; IT-T2-04323) Avail: NTIS HC A06/MF A01 CSCL 02C

Because Multiyear estimation of at-harvest stratum crop proportions is more efficient than single year estimation, the behavior of multiyear estimators in the presence of missing acquisitions was studied. Only the (worst) case when a segment proportion cannot be estimated for the entire year is considered. The effect of these missing segments on the variance of the at-harvest stratum crop proportion estimator is considered when missing segments are not replaced, and when missing segments are replaced by segments not sampled in previous years. The principle recommendations are to replace missing segments according to some specified strategy, and to use a sequential procedure for selecting a sampling design; i.e., choose an optimal two year design and then, based on the observed two year design after segment losses have been taken into account, choose the best possible three year design having the observed two year parent design. Author

N83-12506*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
REMOTE SENSING OF AGRICULTURAL CROPS AND SOILS Final Annual Technical Summary Report
Marvin E. Bauer, Principal Investigator May 1982 208 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E83-10023; NASA-CR-167721; SR-P2-04266; NAS 1.26:167721; LARS-113081) Avail: NTIS HC A10/MF A01 CSCL 02C

Research results and accomplishments of sixteen tasks in the following areas are described: (1) corn and soybean scene radiation research; (2) soil moisture research; (3) sampling and aggregation research; (4) pattern recognition and image registration research; and (5) computer and data base services. Author

N83-12507*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LANDSAT LAND COVER ANALYSIS COMPLETED FOR CIRSS/SAN BERNARDINO COUNTY PROJECT Final Report
William Likens, Keith Maw (Technicolor Graphic Services, Inc., Mountain View, Calif.), and David Sinnott, Principal Investigators Oct. 1982 29 p refs ERTS
(E83-10024; NASA-TM-84244; A-8920; NAS 1.15:84244) Avail: NTIS HC A03/MF A01 CSCL 08B

The LANDSAT analysis carried out as part of Ames Research Center's San Bernardino County Project, one of four projects sponsored by NASA as part of the California Integrated Remote Sensing System (CIRSS) effort for generating and utilizing digital geographic data bases, is described. Topics explored include use of data-base modeling with spectral cluster data to improve LANDSAT data classification, and quantitative evaluation of several change techniques. Both 1976 and 1979 LANDSAT data were used in the project. Author

N83-12508# Ministere de l'Energie et des Ressources (Quebec).
CONFERENCE ON USING NEXT GENERATION EARTH OBSERVATION SATELLITES: SUMMARY HANDBOOK [COLLOQUE SUR L'UTILISATION DE LA PROCHAINE GENERATION DE SATELLITES D'OBSERVATION DE LA TERRE: MANUEL DE SYNTHESE]
Herve Audet, ed. and Keith P. B. Thomson, ed. (Centre Canadien de Teledetection) 1981 79 p refs In FRENCH and ENGLISH Conf. held in Montreal, 24-25 Mar. 1981
Avail: NTIS HC A05/MF A01

Presentations and discussions of the different techniques needed to process the data to be provided by the high resolution visible sensor on SPOT and the thematic mapper on LANDSAT D are highlighted. Experiments conducted to simulate data from these two instruments are described and results, conclusions, and recommendations from each effort are summarized. Transl. by A.R.H.

N83-12509# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
REMOTE SENSING IN GEOLOGY: CURRENT TRENDS AND FUTURE PROSPECTS WITH SATELLITE DATA [SENSORES REMOTOS NA GEOLOGIA: TENDENCIA ATUAL E PERSPECTIVAS FUTURAS COM DADOS DE SATELITES]
Waldir Renato Paradella and Icaro Vitorello Aug. 1982 24 p refs In PORTUGUESE; ENGLISH summary Submitted for publication

(INPE-2514-PRE/193) Avail: NTIS HC A02/MF A01

Orbital remote sensing products, especially LANDSAT imagery are discussed. The user's tendency was toward visual interpretation of aerial photography, radar mosaic, and LANDSAT image for geological applicatons. However, effective use of the information contained in these products depends on their manipulation based on the understanding of the nature and seasonal behavior of the interactions of electromagnetic energy and matter. Spectral regions that can offer the best remote sensing potential for lithological discrimination are also discussed. S.L.

N83-12510# Defense Mapping Agency Aerospace Center, St. Louis, Mo.

CHARTING UTILIZATION REQUIREMENTS FOR A DIGITAL CARTOGRAPHIC DATA BASE

Dennis P. Franklin 1982 14 p

(AD-A118455) Avail: NTIS HC A02/MF A01 CSCL 08/2

The application of computers and computer processes to support chart production at the Defense Mapping Agency Aerospace Center (DMAAC) is discussed. The chart production process is continually being analyzed for application to automation. Source assessment and inventory, control, data collection, chart compilation and revision, color separation and printing can be enhanced or accomplished by automated processes. GRA

N83-12511# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.

COMPARISON OF MULTICHANNEL AND TWO-SATELLITE METHODS FOR REMOTE MEASUREMENT OF SEA SURFACE TEMPERATURE Final Technical Report

Ron Holyer and Jeff Hawkins Jul. 1982 16 p refs

(AD-A118736; NORDA-TN-162) Avail: NTIS HC A02/MF A01 CSCL 17/5

Atmospheric correction of IR satellite data for retrieval of sea surface temperatures (SST) by means of differential absorption can take on two forms. The most popular method utilizes changes in the spectral transmittance of the atmosphere between two or more IR channels (multichannel). The second form employs path length differences in the same spectral band using two satellites. The multichannel and two satellite approaches are applied to coincident imagery and in situ data and compared. GRA

N83-12512# Los Alamos Scientific Lab., N. Mex.

STATISTICAL TECHNIQUES APPLIED TO AERIAL RADIOMETRIC SURVEYS (STARRS): DISCRIMINANT-ANALYSIS METHODS APPLIED TO AERIAL RADIOMETRIC DATA AND THEIR APPLICATION TO URANIUM FAVORABILITY IN SOUTH TEXAS. NATION URANIUM RESOURCE EVALUATION

Fredric L. Pirkle, Newton K. Stablein, Charles D. Koch, Mark E. Johnson, C. Kay Newman, Thomas R. Bement, and David A. Patterson Jul. 1982 114 p refs Prepared in cooperation with Bendix Field Engineering Corp., Grand Junction

(Contracts DE-AC13-76GJ-01664; W-7405-eng-36)

(DE82-020961; GJBX-156-82) Avail: NTIS HC A06/MF A01

In an effort to establish radiometric signatures of geologic units, ten discriminant analysis techniques were applied to aerial radiometric data collected along the Texas Gulf Coast. Results show that partial discriminant analysis with the linear discriminant function applied to the raw data is useful for establishing radiometric signatures and for classifying new observations. Signatures for favorable and unfavorable units along the Texas Gulf Coast were established and new observations were then classified as being from units favorable or unfavorable for hosting uranium deposits based on the established training sets. DOE

N83-12513# High Life Helicopters, Inc., Puyallup, Wash.

AIRBORNE GAMMA-RAY SPECTROMETER AND MAGNETOMETER SURVEY. VOLUME 1. DETAIL AREAS, CHRISTMAS MOUNTAINS, SOLITARIO, GREEN VALLEY/0-2 RANCH, TEXAS Final Report

1982 98 p Prepared in cooperation with QEB, Inc.

(Contract DE-AC13-76GJ-01664)

(DE82-021614; GJBX-195-82-Vol-1) Avail: NTIS HC A05/MF A01

An airborne survey was made by a gamma-ray spectrometer with a large crystal volume, and with a high sensitivity proton precession magnetometer. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, gridded, and contoured to produce maps of the radiometric variables, uranium, potassium, and thorium; their ratios; and the residual magnetic field. These maps were analyzed to produce a multivariant analysis contour map based on the radiometric response of the individual geological units. A geochemical anaysis was performed using the radiometric and magnetic contour maps, the multivariant analysis map, and factor analysis techniques to produce a geochemical analysis map for the area. Systems used in the survey, calibration of the systems, data collection procedures, data processing procedures, the data presentation, interpretation rationale, and interpretation methodology are described. DOE

N83-12514# World Meteorological Organization, Geneva (Switzerland).

HYDROLOGICAL DATA TRANSMISSION

A. F. Flanders 1981 45 p refs

(WMO-559; OHR-14; ISBN-92-63-10559-6) Avail: NTIS MF A01; print copy available at WMO, Geneva

Methods of data transmission, existing facilities and requirements for hydrological purposes are reviewed. The use of satellites, meteor bursts, and the global telecommunication system (gts) to meet these requirements is considered. The GTS could cope with operational and research needs which involve the exchange of information in real time. Satellites offer a data relay facility, linking ships, island stations, ocean buoys, etc. Meteor bursts minimize blockage due to terrain and allow coverage of vast areas.

Author (ESA)

N83-12515# World Meteorological Organization, Geneva (Switzerland).

CONCEPTS AND TECHNIQUES IN HYDROLOGICAL NETWORK DESIGN

M. E. Moss 1952 38 p refs

(WMO-580; OHR-19; ISBN-92-63-10580-4) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 6

The theory and practice of hydrological network design are reviewed. The philosophy of operationally and technologically coordinated networks encompasses the complex interaction of design factors, such as the use of hydrological data in the planning, design and operation of water resources projects, and the cost effectiveness of the information. The concept of an optimum network, the ideal situation, is adapted to achieve a realistic suboptimum network design based on surrogate measures, objectives and criteria. The decision theory which supports the hydrological data network is then developed on the basis of socio-economic analysis, theories of probability, sampling and optimization, correlation, regression and Bayesian analysis, all of which constitute the various building blocks of network design. The various specific techniques which are available for network design are described and future directions in hydrological network design are outlined. Author (ESA)

N83-12516# World Meteorological Organization, Geneva (Switzerland).

LONG-RANGE WATER SUPPLY FORECASTING

M. Dyhr-Nielsen 1982 28 p refs

(WMO-587; OHR-20; ISBN-92-63-10587-1) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 6

Current methods of forecasting water supply over periods ranging from two to four months are reviewed along with the feasibility of combining conceptual deterministic models and statistical data simulation for such forecasts. The term water supply is used with its meaning of runoff volumes over a defined period, such as weekly, monthly or seasonal flows. The techniques described apply not only to water supply projects, but also to irrigation and hydroelectric power projects. Some are equally

well-suited to long range forecasts of floods or low flows and such applications are discussed. Three methods of long-range water supply forecasting are highlighted: regression methods, conceptual models and time series. The operational use of forecasting methods is illustrated. The three methods, including data and computational requirements and accuracy, are compared. Results show that the potential of conceptual models for long-range water supply forecasting is large and, if the accuracy of long range weather forecasts continues to improve, it will be conceptual models which will adapt most efficiently. Author (ESA)

N83-12517# National Academy of Sciences - National Research Council, Washington, D. C. Geophysics Study Committee.
MINERAL RESOURCES: GENETIC UNDERSTANDING FOR PRACTICAL APPLICATIONS Final Report
1981 133 p refs
(Contract DE-EG02-80ER-10757; GR/NSF EAR-79-02458)
(PB82-182114) Avail: NTIS HC A07/MF A01 CSCL 08I

The needs for improved efforts in the location identification, and evaluation of mineral resources are considered. A fundamental understanding of the processes and environments of ore formation are emphasized. The long lead times involved in developing the required knowledge base, applying the results toward locating mineral resources and, the time between identification of a deposit and initiation of production are discussed. Steps to improve the basic understanding are an important element in developing the nation's mineral policy. GRA

N83-12518# Washington Univ., Seattle. Dept. of Civil Engineering.
ESTIMATION OF FLOOD FREQUENCY CHANGES IN THE TOUTLE AND COWLITZ RIVER BASINS FOLLOWING THE ERUPTION OF MT. ST. HELENS
Dennis P. Lettenmaier and Stephen J. Burges Sep. 1981 83 p refs Sponsored by Geological Survey
(PB82-189473; HHL-TR-69) Avail: NTIS HC A05/MF A01 CSCL 08H

Flood frequency changes in two tributaries of the Cowlitz River following the eruption of Mt. St. Helens were estimated. The most heavily affected basin was the Toutle River, which drains the Northwestern flank of the mountain. This basin experienced extreme land form changes, including removal and/or blowdown of vegetation, alteration in drainage networks due to direct blast effects, heavy deposits of ash, and mudflows. The Cispus River, which lies to the north of the Toutle, experienced lesser changes, due exclusively to ash deposition. A conceptual deterministic snowmelt/rainfall/runoff model was applied to both basins for the period 1968-80. Worst case estimates of flood frequency increases for the Toutle ranged from a 37% increase in daily maximum runoff for a 5 year return period, to 25% for a 50 year event. Much lesser increases in flood peaks were predicted for the Cispus River. DOE

N83-12519# Geological Survey, Lakewood, Colo. Water Resources Div.
WATER RESOURCES DATA, WATER YEAR 1980. VOLUME 1. MISSOURI RIVER BASIN, ARKANSAS RIVER BASIN AND RIO GRANDE BASIN Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Dec. 1981 551 p refs Prepared in cooperation with Colorado Div. of Water Resources 3 Vol.
(PB82-188301; USGS/WRD/HD-81/063; USGS/WRD/CO-80/1) Avail: NTIS HC A24/MF A01 CSCL 08H

Water resources data for Colorado for the 1980 water year consisting of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs, and water levels and water quality of wells and springs are presented. Discharge records for about 460 gaging stations, stage and contents of 22 lakes and reservoirs, 4 partial record low flow stations, 30 crest stage partial record stations, and 50 miscellaneous sites; water quality for 163 gaging stations and 300 miscellaneous sites; and water levels for 55 observation wells are reported. A few pertient stations in bordering States also are included. GRA

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-12520# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ANALYTICAL MODE FOR INTERIM EXPANSION OF ELECTRICAL ENERGY GENERATING SYSTEMS M.S. Thesis [MODELO DE ANALISE DA EXPANSAO A MEDIO PRAZO DE SISTEMAS DE GERACAO DE ENERGIA ELETRICA]
Marcelo Laidera Oct. 1982 73 p refs IN PORTUGUESE; ENGLISH summary
(INPE-2558-TDL/104) Avail: NTIS HC A04/MF A01

Some planning aspects concerning to the expansion of Brasilian Electric Power System are presented. It is also presented a model with the aim of formulating and evaluating expansions plans for hydro-thermal generation system characterized by high amount of hydraulic generation, absence of reversible power plants and possibility of long distance energy transmission. Such model gives an expansion plan based upon the scheduling of expansion alternatives, which are classified by their cost/benefit rate, taking into account the influence of new additions on the present system. B.W.

N83-12521# Committee on Governmental Affairs (U. S. Senate).
ENERGY CONSERVATION STRATEGY FOR THE 1980'S
Washington GPO 1982 202 p refs Hearing before the Subcomm. on Energy, Nucl. Proliferation and Govt. Process. of the Comm. on Govt. Affairs, 97th Congr., 1st Sess., 21 Jul. 1981
(GPO-86-217) Avail: Subcommittee on Energy, Nuclear Proliferation and Government Processes

The energy conservation strategy is discussed. The level of oil imports is considered. S.L.

N83-12522# National Aerospace Lab., Tokyo (Japan).
AN EXPERIMENTAL STUDY OF AN AERODYNAMICALLY OPTIMUM WINDMILL
Yoji Ishida, Nobuhiro Toda, Hideo Hoshino, and Masayoshi Noguchi 1982 14 p refs In JAPANESE; ENGLISH summary
(NAL-TR-698; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Aerodynamic characteristics of an optimum horizontal axis windmill are described. The windmill, rated at 20 KW at 8 m/s with a two bladed rotor of 14m diameter, is designed so as to vary the geometry of the blade in such a way that the aerodynamic efficiency becomes maximum. The combined blade element momentum theory is used as an analytical tool. To check the design method and get some useful aerodynamic data, a wind tunnel test of a 1/7th scale model (2m diameter) is performed in a low speed tunnel, whose test section is 35.75 sq m. Two models, whose blades have the same optimum chord distribution but have different planforms, are tested. Measurements are made of the efficiency, torque, axial drag force and initial torque for various combinations of the pitch angle and the tip speed ratio. The yaw characteristics of the windmill are also measured. S.L.

N83-12523*# Computer Sciences Corp., Hampton, Va.
AN ANALYSIS OF THERMAL RESPONSE FACTORS AND HOW TO REDUCE THEIR COMPUTATIONAL TIME REQUIREMENT Contractor Report, 1981-1982
Michael R. Wiese Aug. 1982 60 p refs
(Contract NAS1-16078)
(NASA-CR-165992; NAS 1.26:165992) Avail: NTIS HC A04/MF A01 CSCL 10A

Te RESFAC2 version of the Thermal Response Factor Program

(RESFAC) is the result of numerous modifications and additions to the original RESFAC. These modifications and additions have significantly reduced the program's computational time requirement. As a result of this work, the program is more efficient and its code is both readable and understandable. This report describes what a thermal response factor is; analyzes the original matrix algebra calculations and root finding techniques; presents a new root finding technique and streamlined matrix algebra; supplies ten validation cases and their results. Author

N83-12524*# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
CELL MODULE AND FUEL CONDITIONER DEVELOPMENT Quarterly Report, Jul. - Sep. 1981
J. M. Feret Oct. 1981 33 p
(Contracts DEN3-161; DE-AI01-80ET-17088)
(NASA-CR-165462-A; DOE/NASA/0161-9A; NAS 1.26:165462-A; XAL-72760-AL; QR-8) Avail: NTIS HC A03/MF A01 CSCL 10A

A phosphoric acid fuel cell (PAFC) stack design having a 10 kW power rating for operation at higher than atmospheric pressure based on the existing Mark II design configuration is described. Functional analysis, trade studies and thermodynamic cycle analysis for requirements definition and system operating parameter selection purposes were performed. Fuel cell materials and components, and performance testing and evaluation of the repeating electrode components were characterized. The state of the art manufacturing technology for all fuel cell components and the fabrication of short stacks of various sites were established. A 10 kW PAFC stack design for higher pressure operation utilizing the top down systems engineering aproach was developed. S.L.

N83-12525*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
HEAT PIPE THERMAL SWITCH Patent Application
David A. Wolf, Inventor (to NASA) (Dynatherm Corp.) Filed 15 Oct. 1982 12 p Sponsored by NASA
(NASA-Case-GSC-12812-1; US-Patent-Appl-SN-434674) Avail: NTIS HC A02/MF A01 CSCL 10A

A thermal switch for controlling the dissipation of heat between a body acting as a heat source, and a heat sink is presented. The thermal switch is comprised of a flexible bellows defining an expansible vapor chamber for a working fluid located between an evaporation and condensation chamber. Inside the bellows is located a coiled retaining spring and four axial metal mesh wicks, two of which have their central portions located inside of the spring while the other two have their central portions located between the spring and the side wall of the bellows. The wicks are terminated and are attached to the inner surfaces of the outer end walls of evaporation and condensation chambers respectively located adjacent the heat source and heat sink. NASA

N83-12526# Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
WIND ENERGY CONVERSION DEVICES
1981 381 p refs Lecture series held at Rhode-Saint-Genese, Belgium, 1-5 Jun. 1981
(VKI-LS-1981-8) Avail: NTIS HC A17/MF A01

Wind energy conversion technology is discussed. Wind turbines are considered. Rotor blades, computer programs, and energy storage are also considered. For individual titles, see N83-12527 through N83-12536.

N83-12527# National Aerospace Lab., Amsterdam (Netherlands).
GENERAL INTRODUCTION TO WIND ENERGY CONVERSION
O. deVries *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 127 p refs (For primary document see N83-12526 03-44)
(NLR-MP-81014-U) Avail: NTIS HC A17/MF A01

Different wind turbine and wind concentrator concepts are surveyed. The aerodynamic characteristics of wind turbines are discussed. The choice of the various parameters determining a WECS, such as wind data, turbine control, conversion system, structural, dynamic and cost aspects and environmental impediments is surveyed. The design criteria and the desirability of formulating building codes for WECS are surveyed. Author

N83-12528# IIT Research Inst., Chicago, Ill.
SITE CHARACTERISTICS FOR WIND ENERGY CONVERSION DEVICES
R. S. Norman *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 20 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

The importance of wind characteristics and topography in placing a wind energy system are discussed. N.W.

N83-12529# Illinois Inst. of Tech., Chicago.
HORIZONTAL AND VERTICAL AXIS WIND TURBINES
R. S. Norman *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 20 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Horizontal axis wind turbines are discussed. Vertical axis wind turbines are also discussed. Blade configurations are reviewed. N.W.

N83-12530# Saab-Scania, Linkoping (Sweden).
AERODYNAMIC ANALYSIS OF HORIZONTAL AXIS WIND TURBINES
Olof A. M. Holme *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 40 p (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Axial momentum theory, vortex theory and inviscid flow, viscous flow and aerodynamic loads, derivatives of the aerodynamic load, maximum tip speed ratio, turbine design for maximum power, optimization, and turbines in rotationally unsymmetric flow are discussed. N.W.

N83-12531# Wichita State Univ., Kans. Wind Energy Lab.
AIRFOIL DATA FOR WIND TURBINES
Melvin H. Snyder *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 18 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Some of the problems encountered by wind turbine designers in applying aerodynamic characteristics of airfoil sections to design of wind energy conversion systems are reviewed. It is necessary to know airfoil characteristics over a wider range of Reynolds numbers and angles of attack than is necessary for aircraft applications. Some of the studies of the effects of changing airfoils on wind turbine performance are also reviewed. Author

N83-12532# Wichita State Univ., Kans. Wind Energy Lab.
CONTROL SYSTEMS FOR HORIZONTAL-AXIS WIND TURBINES
Melvin H. Snyder *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 20 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Control requirements for wind turbine systems and problems of conventional controls are discussed. Alternates to pitch control for large horizontal-axis wind turbines are changing pitch of blade tips or use of ailerons or spoilers. Studies was conducted to determine feasibility of using such control systems on the NASA MOD-O machine. Results show that either ailerons or spoilers can provide control necessary to limit turbine power in high wind conditions. An aileron system is recommended for the present application, based upon the ability of ailerons to provide self-starting and added power at low wind speed conditions. The preliminary design study including aileron component sizing and maximum hinge moments was completed and ailerons were fabricated for testing on the MOD-O turbine. Author

N83-12533# Wichita State Univ., Kans. Wind Energy Lab.
WAKES PRODUCED BY SINGLE-ELEMENT AND MULTIPLE-ELEMENT WIND TURBINE TOWERS

Melvin H. Snyder *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 26 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

The near-field wakes downstream of truss towers, of circular cylinders, and of 12-sided cylinders were surveyed in wind tunnels. Local velocity and velocity deficit diagrams are presented. The variation of turbulence in the wake was surveyed and the frequency of the periodic component of wake motion was determined. Differences between wakes of circula cylinders and of 12-sided cylinders are discussed. Effects of strakes, orientation of the 12-sided cylinders, and rounding of the corners are noted. Author

N83-12534# Wichita State Univ., Kans. Wind Energy Lab.
USERS MANUAL FOR WIND
Melvin H. Snyder *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 26 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Information is provided to assist users working with WIND, a program designed to calculate the performance of a wind-axis turbine. Author

N83-12535# Stuttgart Univ. (West Germany). Institute fuer Statik und Dynamik der Luft- und Raumfahrtkonstruktionen.
STATIC AND DYNAMIC ANALYSIS FOR HINGED ROTOR BLADES OF 60 M SPAN FOR A TWO BLADED HORIZONTAL AXIS WIND ENERGY CONVERTER
J. H. Argyris, K. A. Braun, and B. Kirchgaessner *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 51 p refs (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

The static and dynamic behavior of a rotor blade of a horizontal axis wind energy converter with flap- and lag-hinges and with coupling of flap and pitch is investigated. Under the assumption of rigid support of the hub and of constant rotational speed, the linearized equations of motion are developed using a finite element idealization considering quasi-steady aerodynamic forces. The complex eigenfrequencies are calculated. The time history response of the rotor blade is computed for cyclic gravitational loads at rated operation and for a global gust. From the deformation of the structure the stresses at selected points along the blade and forces and moments acting on the tower are calculated. Author

N83-12536# Technical Univ. of Denmark, Lyngby.
USERS EXPERIENCE IN DENMARK: DEVELOPMENTS, ACHIEVEMENTS AND EXPERIENCE OF THE DANISH ACTIVITIES IN WIND ENERGY UTILIZATION, 1974 - 1981
B. Maribo Pedersen *In* Von Karman Inst. for Fluid Dyn. Wind Energy Conversion Devices 1981 11 p (For primary document see N83-12526 03-44)
Avail: NTIS HC A17/MF A01

Denmark initiated activities to investigate the possibility of using wind energy as a supplement to the electricity supply. This would eventually alleviate the burden of increasing prices of fossil fuel and also add to the security of supply of energy to the nation. The activities followed two main streams. A governmental R&D programme was formulated and implemented, whereas at the same time private industry embarked on the development of small scale wind energy converting systems (SWECS) for the private user. Two large scale (630 kW) demonstration wind turbines were completed and are now in fully automatic operation. More than 400 SWECS were put into operation, most of them producing electricity for the owners own use but selling surplus power to the utilities. Author

N83-12537# Honeywell Power Sources Center, Horsham, Pa.
HIGH EFFICIENCY LITHIUM-THIONYL CHLORIDE CELL Final Research and Development Technical Report, 10 Apr. 1981 - 9 May 1982
Narayan Doddapaneni Aug. 1982 97 p refs
(Contract DAAK20-81-C-0381; DA Proj. 1L1-62705-AH-94)
(AD-A118696; DELET-TR-81-0381-F) Avail: NTIS HC A05/MF A01 CSCL 10/3

The polarization characteristics and the specific cathode capacity of Teflon bonded carbon electrodes in the Li/SOCl2 system have been evaluated. Doping of electrocatalysts such as cobalt and iron phthalocyanine complexes improved both cell voltage and cell rate capability. High efficiency Li/SOCl2 cells were thus achieved with catalyzed cathodes. The electrochemical reduction of SOCl2 seems to undergo modification at catalyzed cathode. For example, the reduction of SOCl2 at FePc catalyzed cathode involves 2-1/2 e-/mole of SOCl2. Furthermore, the reduction mechanism is simplified and unwanted chemical species are eliminated by the catalyst. Thus a potentially safer high efficiency Li/SOCl2 can be anticipated. GRA

N83-12538# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
STEVENS HOME, RANCHO SANTA FE, CALIFORNIA: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, OCT. 1981 - APR. 1982
Paul E. Wetzel 1982 73 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021698; SOLAR/1118-82/14) Avail: NTIS HC A04/MF A01

Performance data on a solar water heating system are given. The Stevens Home in Califorina is a single family residence whose active solar energy system is designed to supply 70% of the hot water load. The system is equipped with 68 square feet of flat plate collectors, a 120 gallon solar preheat water tank, and a 40 gallon propane water heater. The solar fraction predicted by computer simulation and measured were the same, 44%. The system solar savings ratio, conventional fuel savings, and solar system coefficient of performance for the period covered are given. Monthly performance data are tabulated for the overall system and for the collector, storage, and domestic hot water subsystems. System operation is illustrated for a typical day by graphs of the temperatures at collector array, inlet and outlet, and at the preheat tank, and of water consumption. The typical operating sequence and solar energy use and heat losses are also graphed. DOE

N83-12539# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
KALIN HOME, LONG ISLAND, NEW YORK: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, SEP. 1981-MAR. 1982
Bion D. Howard 1982 78 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021701; SOLAR/1117-82/14) Avail: NTIS HC A05/MF A01

Performance data on a solar water heating system are given. The Kalin Home is a single family residence in East Meadow, Long Island, New York whose active solar energy system is designed to supply 60% of the hot water load. The system is equipped with 2 flat plate collectors with a combined area of 48 square feet and a 120-gallon tank for storage. Auxiliary heating is provided by a 4.5 kW single-element electric heater interfaced to off-peak power metering equipment to deliver auxiliary energy from midnight through 7:00 AM. Performance data for the total reporting period are summarized. In addition, monthly performance data are tabulated for the overall system and or the collector and domestic hot water subsystems. Predicted performae and performance measured during previous systems are also given for comparison. System operation for a typical day is illustrated by graphs of temperatures at various points in the system vs. time and by hourly water consumption graphs. A typical system operating sequence and solar energy utilization and heat losses are also graphed. DOE

N83-12540# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
EROS DATA CENTER, SIOUX FALLS, SOUTH DAKOTA: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, OCT. 1981 - APR. 1982
Paul E. Wetzel 1982 76 p refs

(Contract DE-AC01-79CS-30027)
(DE82-021703; SOLAR/2122-82/14) Avail: NTIS HC A05/MF A01

Performance data on a solar water heating system are given. The EROS Data Center in South Dakota is a government facility whose active solar energy system is equipped with 9124 square feet of flat plate collectors, 26,893 gallons of hot water storage in an underground vault, and two auxiliary electric hot water boilers. The system provided 40% of the hot water load for the recording period. Other performance data for the period include the solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. Monthly performance data are tabulated for the system overall and for the collector and hot water subsystems. System operation for a typical day is illustrated by graphs of insolation and collector and storage temperatures versus time and of typical water consumption. The typical operating sequence is also graphed. DOE

N83-12541# Geothermal Power Corp., Novato, Calif.
GEOTHERMAL RESERVOIR ASSESSMENT, ROOSEVELT HOT SPRINGS Final Report, 1 Oct. 1977 - 30 Jun. 1982
1982 81 p refs
(Contract DE-AC08-77ET-28406)
(DE82-020632; DOE/ET-28406/1) Avail: NTIS HC A05/MF A01

The geology, geophysics, and geothermal potential of the northern Mineral Mountains, located in Beaver and Millard Counties, Utah, are studied. More specifically, the commercial geothermal potential of lease holdings of the Geothermal Power Corporation is addressed. DOE

N83-12542# Cook Inlet Region, Inc., San Francisco, Calif.
COAL TO METHANOL FEASIBLITY STUDY: BELUGA METHANOL PROJECT. VOLUME 4: ENVIRONMENTAL Final Report
Sep. 1981 472 p refs Prepared in cooperation with Placer Amex, Inc., San Francisco
(Grant DE-FG01-80RA-50299)
(DE82-006057; DOE/RA-50299-1119-Vol-4) Avail: NTIS HC A20/MF A01

The major environmental issues relevant to development of a coal gasification and methanol fuels production facility and related coal mining activities and transportation systems in the west Cook Inlet area, Alaska were assessed. An extensive review into existing information on the Beluga region of west Cook Inlet was conducted and updated with the findings of land resource projects. Specific field activities then were initiated to expand the environmental data base in areas relevant to this project where there was a paucity of information. Based on these findings the project was reviewed in detail to identify significant environmental issues and to outline the state and federal permit requirements to ensure that these element are an integral component of all subsequent project planning and management decisions. DOE

N83-12543# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 3: BEVERLY HIGH SCHOOL, BEVERLY, MASSACHUSETTS
Dec. 1981 41 p refs
(Contract DE-AC04-76DP-00789)
(DE82-006236; SAND-81-7088-3) Avail: NTIS HC A03/MF A01

Software and hardware problems resulted in the loss of sixteen days of data during September. The total electrical energy produced by the PV system during September is listed as 3986 kWh. The meter is manually read only about every other month, but readings which bracket a majority of the days of the month of September indicate an average daily output of 220 kWh per day or 6600 kWh total for the month. Using the average inverter efficiency of 88 percent, shown in report Module 4, infers that the array produced 7500 kWh of dc output energy during September. Similar analysis for October, when data was collected for 26 of 31 days, infers that total system output for the full 31 days was approximately 6800 kWh rather than the recorded value of 5782 kWh. DOE

N83-12544# Hawaii State Dept. of Planning and Economic Development, Honolulu.
GEOTHERMAL POWER DEVELOPMENT IN HAWAII. VOLUME 1. REVIEW AND ANALYSIS
Jun. 1982 134 p refs 2 Vol.
(Contract DE-FC03-79ET-27133)
(DE82-020077; DOE/ET-27133-T2-Vol-1) Avail: NTIS HC A07/MF A01

The history of geothermal exploration in Hawaii is reviewed briefly. The nature and occurrences of geothermal resources are presented island by island. An overview of geothermal markets is presented. Other topics covered are: potential markets of the identified geothermal areas, well drilling technology, hydrothermal fluid transport, overland and submarine electrical transmission, community aspects of geothermal development, legal and policy issues associated with mineral and land ownership, logistics and infrastructure, legislation and permitting, land use controls, Regulation 8, public utilities commission, political climate and environment, state plans, county plans, geothermal development risks, and business planning guidelines. DOE

N83-12545# Pacific Northwest Lab., Richland, Wash.
A SURVEY OF SPECTRAL RESPONSE MEASUREMENTS FOR PHOTOVOLTAIC DEVICES
J. S. Hartman and M. A. Lind Nov. 1981 37 p refs
(Contract DE-AC06-76RLO-1830)
(DE82-006221; PNL-3970) Avail: NTIS HC A03/MF A01

A survey of the photovoltaic community was conducted to ascertain the present state-of-the-art for PV spectral response measurements. Specific topics explored included measurement system designs, good and bad features of the systems, and problems encountered in the evaluation of specific cell structures and materials. The survey showed that most spectral response data are used in diagnostic analysis for the optimization of developmental solar cells. Measurement systems commonly utilize a chopped narrowband source in conjunction with a constant bias illumination which simulates the ambient end use environment. Researchers emphasized the importance of bias illumination for all types of cells in order to minimize the effects of nonlinearities in cell response. Not surprisingly single crystal silicon cells present the fewest measurement problems to the researcher and were studied more thoroughly than any other type of solar cell. But, the accurate characterization of silicon cells is still difficult and laboratory intercomparison studies yielded data scatter ranging from + -5% to + -15%. DOE

N83-12546# Sandia Labs., Albuquerque, N. Mex. Solar Programs Div.
SOLAR THERMAL INDUSTRY STATUS AND FUTURE NEEDS
L. G. Radosevich Jul. 1982 18 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020885; SAND-82-8030) Avail: NTIS HC A02/MF A01

Examined are the state of the solar thermal industry and its needs for the future. Information from a recent survey of industrial firms, a description of industry's research and development needs as stated through the Solar Thermal Energy Association, and a summary of private initiatives are presented. DOE

N83-12547# Lincoln Lab., Mass. Inst. of Tech., Lexington.
J. F. LONG EXPERIMENTAL PHOTOVOLTAIC HOUSE Final Report
Jun. 1982 180 p Prepared in cooperation with Long (John F.) Properties, Inc.
(Contract DE-AC02-76ET-20279)
(DE82-020506; DOE/ET-20279/201) Avail: NTIS HC A09/MF A01

A photovoltaic system was installed and monitored for one year at a three-bedroom, two-bath residence located in the suburbs of Phoenix, Arizona. The roof consists of 120 solar modules divided into five sub-arrays. The output is converted to ac and the system

is grid-connected. The performance of the system overall, of the photovoltaic arrays, inverter, utility interface, and data acquisition system were measured and discussed. Public acceptance of the system is also discussed. The system is illustrated, and performance data are extensively tabulated and graphed. DOE

N83-12548# General Electric Co., Philadelphia, Pa. Energy Systems and Technology Div.
ANALYSIS OF SMALL COMMERCIAL PHOTOVOLTAIC APPLICATIONS
J. Herz, R. Allred, and R. McCarthy Jul. 1982 162 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020924; SAND-81-7172) Avail: NTIS HC A08/MF A01

The objective was to determine promising small commercial (to 500 kW) grid connected photovoltaic applications. Twelve applications were evaluated, including detailed performance and economic analyses covering different collector types, utility rate structures and geographic locations. The attractiveness of battery storage was also examined. DOE

N83-12549# Washington State Energy Office, Olympia.
PASSIVE SOLAR ENERGY IN WASHINGTON: RESULTS OF THE WASHINGTON PASSIVE SOLAR DESIGN/BUILD/ COMPETITION
Mar. 1982 56 p
(Contract DE-FG06-79RO-00003)
(DE82-020394; WAOENG-82-11) Avail: NTIS HC A04/MF A01

The Washington Passive Solar Design and Build Competition was held in an effort to encourage the design, construction, and marketing of moderately priced passive solar homes in Washington state. Four categories were established, including single and multi-family, new design and remodel. A number of commonly made thermal mistakes are discussed. Eight winning entries are presented along with four notable entries, for each of which is given as an overview of the design, energy conservation measures, passive heating and cooling features, system operation, and thermal performance. DOE

N83-12550# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
HIGH-INTENSITY SOLAR CELLS Annual Report
R. J. Schwartz, M. S. Lundstrom, and J. L. Gray Jul. 1982 93 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020420; SAND-82-7122) Avail: NTIS HC A05/MF A01

Described is a program to support an effort to develop high-efficiency, high-concentration solar cells. During the past year this support took the following forms: providing general analytic support for the development of high-efficiency solar cells, and developing a two-dimensional computer code suitable for modelling the performance of the solar cell and othe high concentration cells currently under development. DOE

N83-12551# Motorola, Inc., Phoenix, Ariz. Solar Operations.
CONCENTRATOR-SOLAR-CELL DEVELOPMENT Final Technical Report, 6 Jun. 1980 - 25 Aug. 1981
L. Grenon Jul. 1982 27 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020119; SAND-82-7123) Avail: NTIS HC A03/MF A01

A program is described which is a continuation of earlier programs for the development of high-efficiency, low-cost, silicon concentrator solar cells. The base-line process steps and process sequences identified in these earlier contracts were evaluated and specific processes reviewed. In particular, emphasis on the use of Czochralski-grown silicon wafers rather than float-zone wafers were examined. Additionally, a study of the trade-offs between textured and nontextured cells was initiated, and the limits within which the low-cost plated nickel copper metallization can be used in concentrator solar cell applications was identified. DOE

N83-12552# Stanford Univ., Calif. Center for Materials Research.
ELECTROLYTIC DEPOSITION OF LOW-COST, HIGH-PURITY POLYSILICON SUITABLE FOR USE IN SOLAR-CELL DEVICES Final Technical Report
R. S. Feigelson, R. A. Huggins, and D. Elwell Mar. 1982 39 p refs
(Contract DE-AM03-76ER-70067)
(DE82-012428; DOE/ER-70067-T1; CMR-81-16) Avail: NTIS HC A03/MF A01

Two processes were developd for the commercial production of low cost solar silicon. In the first, silicon is deposited at about 7450 C onto a graphite substrate from a solution of K2SiF6 in the binary KF/LiF or ternary LiF/NaF/KF entectic. The second process involves the deposition of silicon at temperatures above its melting point. Electrodeposition of silicon in the form of coherent, inclusion-free film was achieved, and a 99.999% purity level was attained. An average grain size over 100 microns was attained in films 100 to 200 microns thick, with good film uniformity and good carrier mobility. Electrodeposition of silicon above its melting point was attained at very rapid deposition rates. The purity of this material was close to that required for a source material for pulling or casting of crystals for solar cells. DOE

N83-12553# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, MAY 1982
M. C. Russell, P. Raghuraman, and P. C. Mahoney Jun. 1982 20 p refs
(Contract DE-AC02-76ET-20279)
(DE82-020398; DOE/ET-20279-220) Avail: NTIS HC A02/MF A01

Tabulated are physical performance data for the month of May 1982 obtained from photovoltaic energy systems. Five prototype residential photovoltaic systems are presently under test, each consisting of a roof-mounted photovoltaic array sized to meet at least 50% of the annual electrical demand of an energy-conserving house. In addition to these prototype residential photovoltaic systems are presently under test, each consisting of a roof-mounted photovoltaic array sized to meet at least 50% of the annual electrical demand of an energy-conserving house. In addition to these prototype systems and monitored houses, one full-sized photovoltaic residence is being monitored in Carlisle, Massachusetts. The features of the prottype systems and monitored houses are tabulated, and the monthly summary tabulates meteorological information, monitored house information, and data for the photovoltaic array and power conditioning unit and the utility interface. For each hour of an average day of the month and for each house, there is tabulated the total electric energy used, array output, inverter output, inverter power, load imposed on the prototype, energy supplied to and by the utility, solar array panel temperature, and total tilt insolation. DOE

N83-12554# Total Environmental Action, Inc., Harrisville, N.H.
DESIGN AND FABRICATION OF A PROTOTYPE SYSTEM FOR PHOTOVOLTAIC RESIDENCES IN THE SOUTHWEST Final Report
Jun. 1982 62 p Sponsored in part by New Mexico Solar Energy Inst. and Lincoln Lab., Lexington
(Contract DE-AC02-76ET-20279)
(DE82-020783; DOE/ET-20279/209) Avail: NTIS HC A04/MF A01

Described are the design of a photovoltaic powered residence for the American Southwest, dubbed Casa fotovoltaica, and the construction of a prototype building at the Southwest Residential Experiment Station for testing the performance of the full size photovoltaic (PV) system. Included are architectural drawings of both the residence and the prototype, analysis of the energy requirements of the residence, prediction of PV system output, description of the electrical system, and history of the construction process of the prototype. DOE

N83-12555# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SIMULATION OF THERMAL ASPECTS OF RESIDENTIAL PHOTOVOLTAIC SYSTEMS
G. W. Hart and P. Raghuraman Jun. 1982 37 p refs

(Contract DE-AC02-76ET-20279)
(DE82-020399; DOE/ET-20279/202) Avail: NTIS HC A03/MF A01

A program was developed to simulate the performance of utility interactive residential photovoltaic (PV) energy systems. The PV system is divided into its major functional components, which are individually described with computer models. These models are described in detail. The results of simulation and actual measured data are compared. The thermal influences on the design of such PV energy systems are given particular attention. DOE

N83-12556# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE SOUTHWEST RESIDENTIAL EXPERIMENT STATION, MAR. 1982
M. Lieberman, F. Durand, G. Hocking, and C. Whitaker 26 May 1982 25 p refs Prepared in cooperation with New Mexico Energy Inst., Las Cruces
(Contract DE-AC02-76ET-20279)
(DE82-020400; DOE/ET-20279/197) Avail: NTIS HC A02/MF A01

Physical performance data obtained from the photovoltaic energy systems under test at the Southwest Residential Experiment Station in New Mexico are tabulated for the month of March 1982. Eight prototype residential photovoltaic systems are under test, each consisting of roof-mounted photovoltaic array sized to meet at least 50% of the annual electric demand of an energy-conserving house. An enclosed structure houses the remainder of the photovoltaic system equipment, test instrumentation, and work space. Each system is grid-connected. Features of the residential photovoltaic systems and monitored houses are tabulated. A monthly summary is provided of meteorological data, monitored house information, and photovoltaic array, power conditioning unit, and utility interface data. Monthly averages for each hour of an average day are given of total electric energy used by each house, and of array output, inverter output, load, energy supplied to and by utility, maximum power, and total tilt insolation for each prototype system. Energy histograms are provided for each prototype system. DOE

N83-12557# Department of Energy, Portland, Oreg. Power Administration.
SOLAR HOME SHOW: HOMES DESIGNED FOR THE SOLAR HOMEBUILDERS PROGRAM
Jul. 1982 23 p ref
(DE82-020255; DOE/BP-125) Avail: NTIS HC A02/MF A01

Ten passive solar homes are presented that resulted from a program to demonstrate that passive solar homes can be attractive, affordable, functional, and therefore, marketable. For each home is given: the designer and builder, floor plans, perspective of the outside, passive solar and conservation features, and a comparison of the estimated heating bill for the house and a conventional house the same size. A brief discussion is included on the basics of passive solar design, ventilation and cooling, and solar access. DOE

N83-12558# Brookhaven National Lab., Upton, N. Y.
HARNESSING THE SUN FOR DEVELOPMENT: ACTIONS FOR CONSIDERATION BY THE INTERNATIONAL COMMUNITY AT THE UN CONFERENCE ON NEW AND RENEWABLE SOURCES OF ENERGY FOR PROMOTING THE USE OF RENEWABLE ENERGY IN DEVELOPING COUNTRIES
David J. Jhirad, Vinod Mubayi, and Jerome Weingart (California Univ., Lawrence Berkeley Lab.) Inc.) Aug. 1981 195 p refs Sponsored in part by the Agency for International Development Prepared in cooperation with Teknekron, Inc., Berkeley)
(Contract DE-AC02-76CH-00016)
(DE82-020273; BNL-51463) Avail: NTIS HC A09/MF A01

The technical and economic evidence is reviewed for solar industrial process heat, highlighting the fact that financial parameters such as tax credits and depreciation allowance play a very large role in determining the economic competitiveness of solar investments. An analysis of the energy (and oil) consumed in providing inustrial process heat in a number of selected developing countries is presented. Solar industrial process heat technology is discussed including the operating experience of several demonstration plants in the US Solar ponds are also described briefly. A financial and economic analysis of solar industrial process heat systems under different assumptions on future oil prices and various financial parameters is given. Financial analyses are summarized for a solar industrial process heat retrofit of a brewery in Zimbabwe and a high efficiency system operating in financial conditions typical of the US and a number of other industrialized nations. A set of recommended policy actions for countries wishing to enhance the commercial feasibility of renewable energy technologies in the commercial and industrial sections is presented. DOE

N83-12559# Energy Utilization Systems, Inc., Pittsburgh, Pa.
THE 1980 SURVEY AND EVALUATION OF UTILITY CONSERVATION, LOAD MANAGEMENT, AND SOLAR END-USE PROJECTS. VOLUME 3. UTILITY LOAD MANAGEMENT PROJECT Final Report
Robert P. Blevins Jan. 1982 344 p refs Sponsored in part by ORNL
(Contract W-7405-eng-26; EPRI Proj. 1940-1)
(DE82-007247; EPRI-EM-2193-Vol-3) Avail: NTIS HC A15/MF A01

The results of the 1980 survey of electric utility-sponsored energy conservation, load management, and end-use solar energy conversion projects are described. The work is an expansion of a previous survey and evaluation. There are three volumes and a summary document. Each volume presents the results of an extensive survey to determine electric utility involvement in customer-side projects related to the particular technology (i.e., conservation, solar, or load management), selected descriptions of utility projects and results, and first-level technical, and economic evaluations. DOE

N83-12560# Monsanto Research Corp., Dayton, Ohio.
SUPERIOR HEAT-TRANSFER FLUIDS FOR SOLAR HEATING AND COOLING APPLICATIONS. RESULTS OF ACUTE ORAL-TOXICITY DETERMINATIONS Final Report, 15 Sep. 1980 - 30 Apr. 1981
L. Parts and D. L. Conine (Hill Top Research, Cincinnati) Nov. 1981 36 p refs
(Contract DE-AC04-78CS-35356)
(DE82-002758; MRC-DA-1096-Vol-1) Avail: NTIS HC A03/MF A01

Acute oral toxicity tests were conducted with 22 different heat transfer fluids used in solar collectors. Included among these were three fluids that had been used in collector installations for periods of 1 to 3 years. The acute toxicological properties for transfer fluids when ingested by rats are examined. Their Gosselin's acute oral toxicity ratings range from 1 to 3. It is suggested that the acute oral toxicity of fluids used in solar collectors is sufficiently low that accidental ingestion of doses to produce a lethal effect is not very probable in normal use. By Gosselin's rating system, undiluted ethylene glycol based fluids are classified by toxicity rating of 2 whereas propylene glycol based fluids have the rating 1. It is found that the use of ethylene glycol and propylene glycol based fluids for 1 year, and of an aliphatic hydrocarbon type fluid for 3 years, do not increase their acute toxicological properties significantly. DOE

N83-12561# Fenix and Scisson, Inc., Tulsa, Okla.
PRELIMINARY DESIGN STUDY OF COMPRESSED-AIR ENERGY STORAGE IN A SALT DOME. VOLUME 4. CAES TURBOMACHINERY DESIGN Final Report
P. Zaugg, ed. Jun. 1982 273 p refs Prepared in cooperation with Middle South Services, Inc. and Brown Boveri Corp., North Brunswick and United Engineers and Constructors, Inc. 7 Vol.
(Contract DE-AC02-77ET-29015; EPRI Proj. 1081-2)
(DE82-019781; EPRI-EM-2210-Vol-4; DOE/ET-5054/4) Avail: NTIS HC A12/MF A01

The question of whether it would be possible to build an air storage generating plant capable of operating economically and using leached out salt domes as air reservoirs was investigated.

All the previous reports, most of which have been revised to a large extent, are included. DOE

N83-12562# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
SOLAR-CELL TESTING AND EVALUATION
E. K. Stefanakos and W. J. Collis Apr. 1982 43 p refs
(DE-AC04-76DP-00789)
(DE82-016179; SAND-81-7194) Avail: NTIS HC A03/MF A01

A two year study of the degradation effects in AlGaAs/GaAs solar cells is described. Illuminated current-voltage measurements were made during temperature and humidity cycling and time dependent degradation measurements were recorded. DOE

N83-12563# Borg-Warner Corp., Los Angeles, Calif.
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, CATHEDRAL SQUARE, BURLINGTON, VERMONT, JULY - DECEMBER 1981
K. M. Welch 1981 83 p refs
(Contract DE-AC01-79CS-30027)
(DE82-016999; SOLAR/1060-82/14) Avail: NTIS HC A05/MF A01

A 10 story multiunit aparatment building has an active solar energy system which is designed to supply 51% of the hot water load, and consists of 1798 square feet of flat plate collectors, a 2699 gallon water tank in an enclosed mechanical room on the roof, and two auxiliary natural gas boilers to supply hot water to an immersed heat exchanger in an auxiliary storage tank. The measured solar fraction was only 28%, not 51%, which, it is concluded, is an unreasonable expectation. Other performance data include the solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. Monthly performance data are given for the solar system overall, and for the collector, storage, and hot water subsystems. Insolation data, typical storage fluid temperatures, domestic hot water consumption, and solar heat exchangers inlet-output temperatures, and typical domestic hot water subsystem temperatures are also included. In addition, the system operating sequence, solar energy utilization. A system description, performance evaluation techniques, and long term weather data are given. DOE

N83-12564# Agricultural Research Service, Manhattan, Kans. Wind Erosion Research Unit.
DARRIEUS WIND-TURBINE AND PUMP PERFORMANCE FOR LOW-LIFT IRRIGATION PUMPING Final Report
L. J. Hagen and M. Sharif Oct. 1981 65 p refs Prepared in cooperation with Kansas State Univ., Manhattan
(Contract DE-AI01-76ET-20319)
(DE82-016270; Contrib-79-435-D; DOE/ARS-3707-20741/81-1) Avail: NTIS HC A04/MF A01

In the Great Plains about 15 percent of the irrigation water pumped on farms comes from surface water sources; for the United States as a whole, the figure is about 22 percent. Because of forecast fuel shortages, there is a need to develop alternative energy sources such as wind power for surface water pumping. Specific objectives of this investigation were to: design and assemble a prototype wind powered pumping system for low lift irrigation pumping; determine performance of the prototype system; design and test an irrigation system using the wind powered prototype in a design and test an farm application; and determine the size combinations of wind turbines, tailwater pits, and temporary storage reservoirs needed for successful farm application of wind powered tailwater pumping systems in western Kansas. The power source selected was a two bladed, 6 m diameter, 9 m tall Darrieus vertical axis wind turbine with 0.10 solidity and 36.1 M(2) swept area. DOE

N83-12565# Wynholds (Hans W.) Co., Cupertino, Calif.
SAFETY DATA FOR SMALL WIND SYSTEMS
L. Bass, H. Wynholds, J. Bloedorn, P. Weis, and F. Herzog Sep. 1981 111 p refs Prepared for Rockwell International Corp., Golden, Colo.
(Contract DE-AC04-76DP-03533)
(DE82-015400; RFP-3305) Avail: NTIS HC A06/MF A01

Technical data and recommediations in the development of small wind energy conversion systems (SWECS) safety standards are provided. A SWECS hazards analysis was prepared using system safety techniques. Hazards are identified, standards are proposed, and other appropriate actions are recommended to reduce to the risk of personal injury or property DOE

N83-12566# TEA, Inc., Harrisville, N.H.
STUDY OF PHOTOVOLTAIC RESIDENTIAL RETROFITS. VOLUME 2: MAIN REPORT
D. E. Mahone, P. L. Temple, J. A. Adams, B. B. Chalmers, A. D. Motter, and A. E. Millner Apr. 1982 267 p refs Prepared in cooperation with TriSolar Corp.
(DE82-015626; SAND-81-7019-Vol-2) Avail: NTIS HC A12/MF A01

The problems an potentials for widespread residential retrofits of PV power systems are analyzed. Included are data on the existing housing stock, designs for array mounting and system electrical wiring, and economic analyses for retrofits. DOE

N83-12567# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ROSET: A SOLAR-THERMAL ELECTRIC-POWER SIMULATION USERS GUIDE
Robert ODoherty Aug. 1982 78 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021997; SERI/TR-214-1449) Avail: NTIS HC A05/MF A01

The use of a set of computer programs (ROSET) that simulate solar thermal electric poer systems is outlined. The ROSET is designed to function as part of a larger package of computer models. These models can be used with most utility planning models as part of a method for determining the value of solar energy power systems to electric utilities. DOE

N83-12568# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ELECTRICAL ASPECTS OF PHOTOVOLTAIC-SYSTEM SIMULATION
G. W. Hart and P. Raghuraman Jun. 1982 22 p refs
(Contract DE-AC02-76ET-20279)
(DE82-021956; DOE/ET-20279/207) Avail: NTIS HC A02/MF A01

A TRNSYS simulation was developed to simulate the performance of utility interactive residential photovoltaic energy systems. The PV system is divided into major functional components, which are individually described with computer models. The results of simulation and actual measured data are compared. The electrical influences on the design of such photovoltaic energy systems are given particular attention. GRA

N83-12569# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, APR. 1982
M. C. Russell, P. Raghuraman, and P. C. Mahoney Jun. 1982 20 p refs
(Contract DE-AC02-76ET-20279)
(DE82-021954; DOE/ET-20279/214) Avail: NTIS HC A02/MF A01

Physical performance data obtained from photovoltaic energy systems under test at the Northeast Residential Experiment Station (NE RES) in Concord, Massachusetts, are tabulated for the month of April 1982. Five prototype residential photovoltaic systems are under test at the NE RES, each consisting of a roof mounted array sized to meet at least 50% of the annual electrical demand of an energy conserving house, and an enclosed structure to house the remainder of the photovoltaic system equipment, test instrumentation, and work space. Each system is grid connected. In addition, one full sized PV residence, the Carlisle House, is also being monitored in Carlisle, Massachusetts. The features of the systems and of the houses, are briefly summarized, and the monthly performance of the monitored houses, PV systems, and

meteorological data is tabulated. Also tabulated is hourly information for an average day of the month including data on the monitored houses and prototype systems data. Data include energy consumption, array and inverter outputs, energy supplied to and by the utility, solar array panel temperatures, and total tilt insolation. Also included are tables that present the hypothetical energy exchange between the system and the utility if each prototype system supplied energy to each monitored house. These data are also graphed, as well as the duration of time for which the load had a specific value. DOE

N83-12570# Lincoln Lab., Mass. Inst. of Tech., Lexington. Field Tests and Applications Center.
PV MODULE DEGRADATION-ANALYSIS Final Report
M. P. Themelis Jun. 1982 60 p refs
(Contract DE-AC02-76ET-20279)
(DE82-021123; DOE/ET-20279/189) Avail: NTIS HC A04/MF A01

The energy potential of photovoltaic (PV) components in various test applications were evaluated. Visual and electrical degradation analyses were performed on 47 PV modules. Discoloration, cracking, scratches, and electrical degradation were detected. DOE

N83-12571# California Univ., Livermore. Lawrence Livermore Lab.
FLUIDIZED-BED PYROLYSIS OF OIL SHALE: OIL YIELD, COMPOSITION, AND KINETICS
J. H. Richardson, E. B. Huss, L. L. Ott, J. E. Clarkson, M. O. Bishop, J. R. Taylor, L. J. Gregory, and C. J. Morris Sep. 1982 72 p refs
(Contract W-7405-eng-48)
(DE82-021010; UCID-19548) Avail: NTIS HC A04/MF A01

A quartz isothermal fluidized bed reactor was used to measure kinetics and oil properties relevant to surface processing of oil shale. The rate of oil formation was described with two sequential first order rate equations characterized by two rate constants. These rate constants together with an expression for the appropriate weighting coefficients describe approximately 97% of the total oil produced. The results of different attempts to mathematically describe the data in a manner suitable for modeling applications are related. Preliminary results for species selective kinetics of methane, ethene, ethane and hydrogen, where the latter is clearly distinguished as the product of a distinct intermediate are also presented. Oil yields from Western oil shale are approximately 100% Fischer assay. Oil composition is based on previous work and the higher heating rates inherent in fluidized pyrolysis. Neither the oil yield, composition nor the kinetics varied with particle size between 0.2 and 2.0 mm within experimental error. The qualitatively expected change in oil composition due to cracking was observed over the temperature range studied. Eastern shale exhibited significantly faster kinetics and higher oil yields than did Western shale. DOE

N83-12572# Energy Research Corp., Danbury, Conn. Energy and Environment Div.
DEVELOPMENT OF A HIGH-RATE INSOLUBLE ZINC ELECTRODE FOR ALKALINE BATTERIES
Alan Charkey Apr. 1982 33 p
(Contract DE-AC03-76SF-00098)
(DE82-020608; LBL-14674) Avail: NTIS HC A03/MF A01

The development of an insoluble zinc electrode for alkaline batteries is discussed. Active material was mixed dry with materials which would provide an insoluble matrix after initial reaction in the cell electrolyte. These electrodes are expected to exhibit improved performance in two ways. Firstly, there is an even distribution of permanent, highly conductive nucleation sites along the apparent electrode surface, providing for even Zn deposition and distribution during charging. Secondly, the increase in effective surface area decreases actual current densities, thereby, decreasing overvoltages. This should decrease dendrite formation and gas evolution in addition to allowing for the use of higher apparent current densities. Problems posed by the development of this type of electrode material are, for the most part, material selection problems. Materials must be chosen carefully, not just to fulfill their given function within the electrode system, but also to provide for minimal counterproductive interaction with each other. DOE

N83-12573# California Univ., Berkeley. Lawrence Berkeley Lab.
TECHNOLOGY-BASE RESEARCH PROJECT FOR ELECTROCHEMICAL STORAGE REPORT FOR 1981
Frank McLarnon, ed. Jun. 1982 95 p refs
(Contract DE-AC03-76SF-00098)
(DE82-020599; LBL-14305) Avail: NTIS HC A05/MF A01

The technology base research (TBR) project which provides the applied reseach base that supports all electrochemical energy storage applications: electric vehicles, electric load leveling, storage of solar electricity, and energy and resource conservation is described. The TBR identifies electrochemical technologies with the potential to satisfy stringent performance and economic requirements and transfer them to industry for further development and scale up. The TBR project consists of four major elements: electrochemical systems research, supporting research, electrochemical processes, and fuel cells for transportation. Activities in these four project elements during 1981 are summarized. Information is included on: iron-air batteries; aluminum-air batteries; lithium-metal sulfide cells; materials development for various batteries; and the characteristics of an NH3-air alkaline fuel cell in a vehicle. DOE

N83-12574# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
WILLIAMSON HOME, IPSWICH, MASS. SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOV. 1981 - APR. 1982
Michael Cramer 1982 82 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021300; SOLAR/1115-82/14) Avail: NTIS HC A05/MF A01

Data on solar water and space heating systems are given. The Williamson Home in Massachusetts is a single family residence whose active-solar-energy system is designed to supply 47% of the space heating and 91% of the hot water. The system is equipped with 339 square feet of flat plate collectors, a 240-cubic-foot rock bin for storage, a propane-gas furnace and a 100-gallon propane gas hot water tank for auxiliary heating. Monthly performance data are tabulated for the overall system and for the collector, hot water, and space heating subsystems. Also tabulated are solar coefficients of performance, solar operating energy, energy savings, and weather conditions. Also given is a graph of collector array efficiency versus the difference between the inlet water and ambient temperatures divided by insolation. System operation is illustrated by graphs of typical insolation data and outside ambient and indoor temperatures, collector operating periods and inlet/outlet temperatures, and typical storage and distribution temperatures versus time for a typical day. The system operating sequence and solar energy utilization and losses are also graphed. DOE

N83-12575# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
LO-CAL, CHAMPAIGN, ILLINOIS SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, JAN. 1982 - APR. 1982
J. W. Spears 1982 73 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021299; SOLAR/1109-82/14) Avail: NTIS HC A04/MF A01

Performance data on a solar heated house are given. The Lo-Cal site is a single family residence in Illinois with a direct gain solar heating system equipped with 200 square feet of south facing triple glazed windows and an auxiliary 84,000 Btu hour forced air furnace. For the months of January through April 1982, the solar fraction was found to be 29%, corresponding to a saving of 3107 kWh of conventional fuel. Monthly performance data are tabulated for the overall system, and for the collector and space heating subsystems. Also tabulated are monthly energy savings,

weather, and passive system environment data. The building's performance is illustrated by graphs for each month of the daily insolation, auxiliary heat, building temperature, and ambient temperature. DOE

N83-12576# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
ISAKSON HOME, ANOKA, MINNESOTA SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, AUG. 1981 - MAR. 1982
Michael Cramer 1982 77 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021297; SOLAR/1116-82/14) Avail: NTIS HC A05/MF A01

Performance data on a residential solar water and space heating system are given. The Isakson Home in Minnesota is a single family residence whose active solar energy system is designed to supply 76% of the heating and hot water load. The system consists of 183 square feet of flat plate collectors, a 350 gallon water storage tank, and for back-up, an oil fired furnace and 52 gallon electric water heater. Monthly performance data are given for the overall system and for the collector, domestic hot water, and space heating subsystem. Monthly data are also tabulated for the coefficient of performance, solar operating energy, energy savings, and weather. Typical system operation is illustrated by graphs of temperatures at various parts of the system versus time for a typical day, and by graphs of fuel use and hot water use versus time. The system operating sequence is also graphed and solar energy utilization and losses are given. DOE

N83-12577# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
KARASEK HOME, BLACKSTONE, MASSACHUSETTS SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOV. 1981 - MAR. 1982
Michael Raymond 1982 89 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021302; SOLAR/1120-82/14) Avail: NTIS HC A05/MF A01

The Karasek Home is a single family Massachusetts residence whose active-solar-energy system is equipped with 640 square feet of trickle-down liquid flat-plate collectors, storage in a 300-gallon tank and a 2000-gallon tank embedded in a rock bin in the basement, and an oil-fired glass-lined 40-gallon domestic hot water tank for auxiliary water and space heating. Monthly performance data are tabulated for the overall system and for the collector, storage, space heating, and domestic hot water subsystems. For each month a graph is presented of collector array efficiency versus the difference between the inlet water temperature and ambient temperature divided by insolation. Typical system operation is illustrated by graphs of insolation and temperatures at different parts of the system versus time for a typical day. The typical system operating sequence for a day is also graphed as well as solar energy utilization and heat losses. DOE

N83-12578# Los Alamos Scientific Lab., N. Mex.
PASSIVE-SOLAR TEST MODULES
E. F. Moore (Miami Univ.) and R. D. McFarland Jun. 1982 80 p refs
(Contract W-7405-eng-36)
(DE82-021841; LA-9421-MS) Avail: NTIS HC A05/MF A01

Presented are the results of a survey of the use of test boxes, rooms, and buildings for passive solar research in the United States and Canada. In addition to presenting a survey, an introductory guide to experimental methods is passive solar heating for researchers who have limited familiarity with test module design, heat transfer, computer simulation, and data acquisition is provided. The experimental uses and physical characteristics of test modules are discussed and existing facilities are described. Basic principles of thermal network computer modeling of passive systems, test room thermal load measurement, and data acquisition systems are described in appendices. DOE

N83-12579# Automation Industries, Inc., Silver Spring, Md.
ENVIRONMENTAL PARTNERSHIP, CREAM RIDGE, NEW JERSEY: SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, OCTOBER 1981 THROUGH MARCH 1982
P. W. Kendall 1982 85 p refs
(Contract DE-AC01-79CS-30027)
(DE82-021303; SOLAR/1027-82/14) Avail: NTIS HC A05/MF A01

The Environmental Partnership site (also known as the Bonillia Home) is a two story, single family home on a wooded lot in New Jersey. The wood platform framed house uses three major passive solar energy systems a 168 square foot sunspace, a 344 square foot Trombe wall, and a breadbox type passive solar hot water heater. The system was designed to provide 75% of the total load at the site, but only achieved 30%. Storage is in a 50,000 pound concrete wall 12 inches thick and in 32 3 foot phase change rods. Auxiliary systems include a dual fuel wood/propane furnace, wood stove, 50 gallon auxiliary water heater with propane fuel, and a cooling fan. Monthly performance data are tabulated for the overall solar heating system and for the individual components - Trombe wall, sunspace, storage, water heater, and space heating subsystem. Monthly data are also tabulated for weather, energy savings, and the passive solar system environment. Typical system operation is illustrated by graphs of temperatures at various places in the system versus time for a typical day. The system operating sequence is also illustrated by a bar chart of the operation of the wood/propane furnace and the fan. DOE

N83-12580# One America, Inc., Washington, D.C.
QUESTIONS AND ANSWERS ABOUT ENERGY RECOVERY FROM WASTE
Washington DOE Sep. 1982 29 p refs
(Contract DE-AC01-80CS-24312)
(DE82-022154; DOE/CS-24312/4) Avail: NTIS HC A03/MF A01

Questions and answers about the developing waste-to-energy industry are presented. They are intended as a ready reference for the general public and others interested in exploring the option of utilizing municipal waste as a renewable energy resource. Questions were researched and answered in six broad categories: general information; state-of-the-art; economics/financial; environmental; institutional; and project implementation. DOE

N83-12581# Department of Energy, Washington, D. C. Office of the Secretary.
SECRETARY'S REPORT TO CONGRESS. SECRETARY'S STATEMENT, PROGRAM REVIEW AND OUTLOOK Annual Report
Aug. 1982 176 p
(DE82-021878; DOE/S-0010-82) Avail: NTIS HC A09/MF A01

All elements of the Department of Energy are discussed. Three annexes are included: the Fifth Report to Congress - Comprehensive Program and Plan for Federal Energy Education, Extension, and Information Activities (Published December 1981 by the Office of State and Local Programs, Office of Conservation and Renewable Energy, US Department of Energy); Third Annual Report to Congress on the Automotive Technology Development Program (Published February 16, 1982, by the Office of Vehicle and Engine Research and Development, Office of Conservation and Renewable Energy,US Department of Energy); and Observations and Recommendations on the Future of the Energy Extension Service Program; Fourth Report by the National Energy Extension Service Advisory Board (Published January 182 by the Office of State and Local Programs, Office of Conservation and Renewable Energy, US Department of Energy). DOE

N83-12582# Westinghouse Electric Corp., Pittsburgh, Pa.
RESEARCH, DEVELOPMENT AND DEMONSTRATION OF NICKEL-IRON BATTERIES FOR ELECTRIC-VEHICLE PROPULSION Annual Report, 1981
Mar. 1982 128 p
(Contract W-31-109-eng-38)
(DE82-021216; ANL/OEPM-81-14) Avail: NTIS

HC A07/MF A01

Full-size, prototype cell, module and battery fabrication and evaluation, aimed at advancing the technical capabilities of the nickel-iron battery, while simultaneously reducing its potential cost in materials and process areas are discussed. Improved electro-precipitation process nickel electrodes of design thickness (2.5 mm) are now being prepared that display stable capacities for the C/3 drain rate with less than 10% capacity decline for greater than 1000 test cycles. Iron electrodes of the composite-type are delivering 24 Ah at the target thickness (1.0 mm). Iron electrodes also are displaying capacity stability for greater than 1000 test cycles in continuing 3-plate cell tests. Finished cells delivered 57 to 63 Wh/kg at C/3, and have demonstrated cyclic stability up to 1200 cycles at 80 percent depth of discharge profiles. Modules exceeded 580 test cycles and remain on test. Reduction in nickel electrode swelling (and concurrent stack starvation), to improve cycling, continues to be an area of major effort to reach the final battery cycle life objectives. DOE

N83-12583# Argonne National Lab., Ill.
ANNUAL SYNOPSIS OF ARGONNE'S AQUEOUS BATTERY SUPPORT RESEARCH, FISCAL YEAR 1981
Mar. 1982 38 p refs
(Contract W-7405-eng-38)
(DE82-021143; ANL/OEPM-82-3) Avail: NTIS HC A03/MF A01

The major activities of the Battery Support Group research staff for fiscal year 1981 are described. The present activities are ultimately directed at improving the performance of lead-acid, nickel/zinc and nickel/iron batteries, especially those for electric vehicle or utility load-leveling applications. In addition to short descriptions of each of the projects, summaries of work accepted for publication, published or presented during the year are included. DOE

N83-12584# Nevada Univ., Reno. Div. of Earth Sciences.
LOW- TO MODERATE-TEMPERATURE GEOTHERMAL RESOURCE ASSESSMENT FOR NEVADA: AREA SPECIFIC STUDIES, PUMPERNICKEL VALLEY, CARLIN AND MOANA Final Report, 1 Jun. 1981 - 31 Jul. 1982
Dennis T. Trexler, Thomas Flynn, Brian A. Koenig, Elaine J. Bell, and George Chusn, Jr. 1982 197 p refs
(Contract DE-AC08-81NV-10220)
(DE82-018598; DOE/NV-10220/1) Avail: NTIS HC A09/MF A01

Geological, geophysical and geochemical surveys were used in conjunction with temperature gradient hole drilling to assess the geothermal resources in Pumpernickel Valley and Carlin, Nevada. A statewide assessment of geothermal resources that was completed in 1979 was used. The exploration techniques are based on previous federally-funded assessment programs that were completed in ix other areas in Nevada and include: literaure search and compilation of existing data, geologic reconnaissance, chemical sampling of thermal and non-thermal fluids, interpretation of satellite imagery, interpretation of low-sun angle aerial photographs, two-meter depth temperature probe survey, gravity survey, seismic survey, soil-mercury survey, and temperature gradient drilling. DOE

N83-12585# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
TELLURIDE SCHOOL, TELLURIDE, COLORADO SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, FEBRUARY 1982 - APRIL 1982
K. M. Welch 1982 80 p refs
(Contract DE-AC01-79CS-30027)
Avail: NTIS HC A05/MF A01

In Colorado with a passive/active hybrid solar energy system designed to supply 40% of the heating load is discussed. The school is equipped with a 1428 square foot, double glazed Trombe wall, a 1392 square foot greenhouse with collection tube, and an auxiliary oil fired boiler. Monthly performance data are tabulated for the overall system and for the Trombe wall, greenhouse, and greenhouse storage. System operation is illustrated by graphs of typical Trombe wall insolation and temperatures and typical greenhouse insolation and temperatures. DOE

N83-12586# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
WOOD ROAD SCHOOL, BALLSTON SPA, NEW YORK SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION, NOVEMBER 1981 - APRIL 1982
P. W. Kendall 1982 86 p refs
(DE82-021301; SOLAR/2125-82/14) Avail: NTIS HC A05/MF A01

The Wood Road School Solar Project is a 216,000 square foot (136,510 square feet of sola conditioned space) school located in New York. The solar energy system supplies 64% of the space heating and 88% of the hot water. The system is equipped with 15,389 square feet of one type of flat plate collector panels and 6650 square feet of another type. Storage is in two 15,000 gallon storage tanks, and auxiliary heating is by electric resistance strip heaters. Monthly performance data are tabulated for the overall system and for each type of collector, storage, domestic hot water, and space heating subsystems. Weather conditions energy savings, operating energy, and coefficients of performane are tabulated monthly. Graphs are provided of collector array efficiency vs the difference between the fluid inlet temperature and ambient temperature divided by insolation. System operation is illustrated by graphs of collector array inlet/outlet temperatures and ambient temperature and typical building loop temperatures vs time for a typical day. The system operating sequence and the solar energy utilization and energy losses are graphed. DOE

N83-12587# Midwest Research Inst., Golden, Colo. Component Development and Fabrication Group.
STRUCTURAL DESIGN CONSIDERATIONS FOR A LINE-FOCUS REFLECTIVE MODULE USING INEXPENSIVE COMPOSITE MATERIALS
L. M. Murphy Aug. 1982 59 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021611; SERI/TR-253-1450) Avail: NTIS HC A04/MF A01

The structural design aspects of a parabolic trough reflective module is addressed. The reflective module is a lightweight, low flexural rigidity design that is rotated about the focal line. The modules and support frame are designed to rotate with a cable drive system in a cross row manner. Analysis indicates that the structural and optical aspects of the reflector frame concept are adequate, with dramatic savings in weight and costs for the structure. DOE

N83-12588# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
SCATTERPLATE FLUX MAPPING FOR SOLAR CONCENTRATORS
Keith Masterson and Mark Bohn Sep. 1982 17 p refs Presented at the Ann. Meeting of the Optical Soc. of Am., Chicago, 13-17 Oct. 1981
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-021359; SERI/TR-255-1432) Avail: NTIS HC A02/MF A01

Developing the ability to characterize accurately the spatial distribution of solar energy at the receiver is a part of advanced solar thermal conversion technology. High power levels near the focus of a point focus concentrator make this difficult because of the large thermal stress placed on materials and components. A scatterplate flux mapping technique developed at the Solar Energy Research Institute (SERI) that solves many material problems and the optical characteristics of several scatterplate materials are described. The errors contributed by a scatterplate with nonideal characteristics typical of the materials used are assessed. DOE

N83-12589# National Bureau of Standards, Washington, D.C.
COMPARATIVE ANALYSIS OF ECONOMIC MODELS IN SELECTED SOLAR ENERGY COMPUTER PROGRAMS Final Report
Jeanne W. Powell and Kimberly A. Barnes Jan. 1982 83 p refs Sponsored by DOE
(PB82-184995; NBSIR-81-2379) Avail: NTIS HC A05/MF A01

CSCL 10A

The economic evaluation models in five computer programs widely used for analyzing solar energy systems (F-CHART 3.0, F-CHART 4.0, SOLCOST, BLAST, and DOE-2) are compared. Differences in analysis techniques and assumptions among the programs are assessed from the point of view of consistency with the Federal requirements for life cycle costing (10 CFR Part 436), effect on predicted economic performance, and optimal system size, case of use, and general applicability to diverse systems types and building types. The FEDSOL program developed by the National Bureau of Standards specifically to meet the Federal life cycle cost requirements serves as a basis for the comparison. Results of the study are illustrated in test cases of two different types of Federally owned buildings: a single family residence and a low rise office building. A.R.H.

N83-12590# Energy and Environmental Analysis, Inc., Arlington, Va.

INDUSTRIAL ENERGY USE, ANNUAL REPORT FOR 1979 - 1980 Final Report

M. O. Lerner, V. S. Kothari, A. Sarin, D. C. Hauth, and C. P. Kaplan 20 Jan. 1982 121 p refs

(Contract GRI-5014-342-0185)

(PB82-200585; GRI-79/01031) Avail: NTIS HC A06/MF A01 CSCL 10A

Results of a study covering major energy-intensive industries to identify areas with high potentials for improvement in the efficiency of industrial gas use are given. About 85 percent of all natural gas used in industrial process heaters is accounted for in the seven industries which are primary metals (iron and steel, aluminum), stone, clay and glass, petroleum, chemicals, food, textiles, and paper. The study proceeded in four major steps. In step 1, the most recent industrial fuel use data was collected, checked, and disaggregated by process, furnace, and fuel type using five national energy consumption data bases. In Step 2, efficiency and heat distribution for 40 furnaces were determined using energy and material balances. In Step 3, discussions were held with industry representatives to obtain feedback on the study's findings relating to current and future uses of alternate energy sources and promising conservation options which are available or under development. In Step 4, quantitative data on total energy use and typical furnace efficiency were incorporated with qualitative information on future fuel use trends, future changes in process/furnace mix, etc., to identify areas where maximum gains in energy efficiency could occur. GRA

N83-12591# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

A REVIEW OF THE ENERGY PRODUCTIVITY CENTER'S LEAST COST ENERGY STRATEGY STUDY Final Report

David O. Wood, Michael Manove, and Ernst R. Berndt Nov. 1981 246 p refs Revised Sponsored by Electric Power Research Inst.

(PB82-188111; MIT/EL-81-043) Avail: NTIS HC A11/MF A01 CSCL 10A

Ways the nation would have provided energy services if its capital stock had been reconfigured to be optimal for actual 1978 energy prices were studied. It is concluded that if the 1978 capital stock had been transformed in conformance with a least-cost principal for providing energy services, per capital energy services would have been reduced by 17%. Author (GRA)

N83-12592# Texas A&M Univ., College Station. Dept. of Chemical Engineering.

METAL CHELATE CATALYSTS FOR FUEL CELLS Annual Report

R. Darby, R. White, M. Yamana, and M. Tsutsue Jul. 1981 34 p

(Contract GRI-5014-363-0174)

(PB82-195637; GRI-81/0027) Avail: NTIS HC A03/MF A01 CSCL 10B

A variety of metal chelates were synthesized and evaluated for their activity as oxygen cathode electrocatalysts in strong acidic electrolytes. It was found that Cobalt tetraazaanulene (CoTAA) and iron phthalocyanine (FePc) exhibit the best activity of all the metal chelates synthesized, but have very limited stability. The proposed solution to this problem is the synthesis of polymeric forms of these chelates, with comparable active and considerably greater stability than the monomers. Three methods for stability testing were developed: (1) Potentiostatic, with periodic measurement of the current potential characteristic; (2) potentiostatic, with continuous monitoring of the current, and; (3) galvanostatic, with continuous monitoring of potential. Each method provides a good evaluation of activity versus time, and the method to be used depends upon the objective of the test. A polymeric form of Co(TAA) was synthesized by means of an acetylene terminated monomer, which in turn was made via a Co(TAA)Br2 intermediate. The activity of the polymer was found to be comparable to that of Co(TAA) monomer, and significantly greater than that of either the stacked or sheet polymeric forms of Cobalt tetraphenylporphrine (CoTPP) previously synthesized and tested. Author (GRA)

N83-12593# Energy and Environmental Analysis, Inc., Arlington, Va.

INDUSTRIAL ENERGY USE, VOLUME 2 Final Report, Jul. 1979 - Apr. 1981

Michael O. Lerner, Arun Sarin, and Virenda S. Kothari Jan. 1982 285 p refs Sponsored by Gas Research Inst.

(PB82-200593; GRI-79/0103.2) Avail: NTIS HC A13/MF A01 CSCL 10A

The results of a study covering seven major energy-intensive industries to identify areas with high potential for improvement in the efficiency of industrial gas use are given. The industries studied include primary metals (iron and steel, aluminum); stone, clay, and glass; petroleum; chemicals; food; textiles; and paper. GRA

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-12594 British Library Lending Div., Boston Spa (England).

POPULATION HAZARDS RESULTING FROM THE COMBUSTION OF FOSSIL FUELS AND THE NUCLEAR POWER INDUSTRY

Zbignew Jaworowski 9 Sep. 1982 17 p refs Transl. into ENGLISH from Post. Fiz. Med. (Poland), v. 10, no. 1-2, 1975 p 149-154

(BLL-Risley-TR-4173-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The building of nuclear power stations into existing power industry systems, is frequently met with negative public opinion as well as administrative opposition resulting from distrust of this new source of energy. The biological damage to the population resulting from nuclear energy sources and those injuries resulting from so called conventional power stations based on fossil fuel are compared. It is suggested that nuclear power stations and the effects of industrial activities associated with them (uranium mines, fuel production and processing plants), impairment of the health of the population living in their vicinity may result primarily from the radionuclides released into the environment near these installations. It is concluded that conventional power stations expose the population to hazards of large quantities of dusts and chemical compounds, the adverse effects of which are incomparably greater than the radiation effects of power stations of both types. E.A.K.

N83-12595*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

CHARACTERIZATION OF SOIL AND POSTLAUNCH PAD DEBRIS FROM CAPE CANAVERAL LAUNCH COMPLEX AND ANALYSIS OF SOIL INTERACTION WITH AQUEOUS HCL

G. L. Pellett, L. W. Spangler, R. W. Storey, and R. J. Bendura Oct. 1982 26 p refs Presented at an Environ. Effects Program Review at Cocoa Beach, Fla., Mar. 1978

(NASA-TP-2076; L-15433; NAS 1.60:2076) Avail: NTIS

HC A03/MF A01 CSCL 13B

Soil samples were fractionated and analyzed in order to assess the physical and chemical interactions of entrained soil with solid-rocket exhaust clouds. The sandy soil consisted primarily of quartz (silica) particles, 30 to 500 microns in diameter, and also contained seashell fragments. Differential and cumulative soil-mass size distributions are presented along with mineralogy, elemental compositions, and solution pH histories. About 90 percent of the soil mass consisted of particles > 165 microns in diameter. Characteristic reaction times in aqueous HCl slurries varied from a few minutes to several days, and capacities for reaction under acidic conditions varied from > 10 to > 40 g HCl/kg soil, depending on particle size. Airborne lifetimes of particles > 165 microns are conservatively < 30 min, and this major grouping is predicted to represent a small short-term chemical sink for up to 5% of the total HCl. The smaller and more minor fractions, below a 165 micron diameter, may act as giant cloud condensation nuclei over much longer airborne lifetimes. Finally, the demonstrated time dependency of neutralization is a complicating factor; it can influence the ability to deduce in-cloud HCl scavenging with reaction and can affect the accuracy of measured chemical compositions of near-field wet deposition. Author

N83-12596# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

LOW-LATITUDE TOTAL OZONE MEASUREMENTS IN THE BRAZILIAN SECTOR

Y. Sahai, R. P. Kane, and N. R. Teixeira Aug. 1982 20 p refs Submitted for publication

(INPE-2509-PRE/188) Avail: NTIS HC A02/MF A01

Regular measurements of the atmospheric ozone in the Brazilian sector were started at Cachoeira Paulista (22.7 deg S, 45.0 deg W), and Natal (5.8 deg S, 35.2 deg W) in May 1974 and November 1978, respectively. The results of the total ozone measurements carried out at these two stations up to 1981 are presented in this communication and compared with other low-and mid-latitude stations. Although Natal is an equatorial station, it presents a prominent annual variation, and the average toal ozone content is high compared to satellite measurements. During 1977-78, abnormaly low values of total ozone were observed at Cachoeira Paulista. Some preliminary results about the QBO (quasi-biennial oscillation) during 1974-81 are also presented.

Author

N83-12597# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

ESTIMATION OF POLLUTION CONCENTRATION AT CACAPAVA, SP, USING A THREE DIMENSIONAL NUMERICAL MODEL [ESTIMATIVAS DE CONCENTRACAO DE POLUENTES PARA CACAPAVA SP, USANDO-SE UM MODELO NUMERICO TRIDIMENSIONAL]

Nelson Arari and Luiz Carlos B. Molion Sep. 1982 22 p refs In PORTUGUESE; ENGLISH summary

(INPE-2529-RPE/417) Avail: NTIS HC A02/MF A01

A three dimensional numerical model of atmospheric dispersion was used to estimate concentrations of lead particulate matter. Climatological studies for the region indicate that there is a predominance of calm winds, i.e. below the anemometer threshold (.01 m.s), and low inversion layers. The model is the most adequate in these circumstances, because it estimates concentrations with wind speeds lower than .01 m.s and varies the height of the mixing layer. Using standard meteorological data the model calculates the spatial and temporal distribution of concentration resulting from pollutants emission of a continuous point source.

S.L.

N83-12598# Air Force Space Div., Los Angeles, Calif.

DRAFT SUPPLEMENT TO FINAL ENVIRONMENTAL IMPACT STATEMENT, SPACE SHUTTLE PROGRAM, VANDENBERG AFB, CALIFORNIA

Feb. 1982 433 p refs

Avail: NTIS HC A19/MF A01

Environmental issues and concerns are addressed. The results of several studies which offer new insights into the impacts of constructing and operating the Shuttle Program are presneted. Major changes in the Shuttle Program, existing impacted environments, and expected changes are described. The environmental process used to assist program officials in early planning and decision making is documented. N.W.

N83-12599# World Meteorological Organization, Geneva (Switzerland).

ON THE DEVELOPMENT OF MULTIMEDIA MONITORING OF ENVIRONMENTAL POLLUTION

1980 551 p refs Symp. held in Riga, USSR, 12-15 Dec. 1978 Original contains color illustrations

(WMO-563; SER-15; ISBN-92-63-10563-4) Avail: NTIS MF A01; print copy available at WMO, Geneva

Theoretical and practical approaches to integrated monitoring, including migration of pollutants between different geophysical media, and effects of pollutants on flora and fauna are discussed. Sessions were devoted to the scientific basis and aims of monitoring systems, levels of pollution, the spread and cycles of pollutants, and assessment and forecasting of the impact of pollutants on ecosystems and climate. For individual titles, see N83-12600 through N83-12655.

N83-12600# Hydrometeorological Centre of the USSR (Moscow). Committee for Hydrometeorological and Control of the Natural Environment.

MAIN PRINCIPLES OF MONITORING THE NATURAL ENVIRONMENT AND CLIMATE

Y. A. Izrael *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 3-14 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The philosophy underlying the monitoring and control of pollutants in the USSR is exposed, and similarities with the Global Environmental Monitoring System are pointed out. Environmental monitoring is an integrated subsystem of biosphere monitoring and includes observations, but also assessments and predictions of man-induced changes as well as ecosystem responses to the changes. The importance of biosphere reserves, where background measurements are taken, is stressed. Observations of both climax ecosystems and succession series of ecosystems which are evolving under natural conditions (e.g. recovery after fire) and as a result of short anthropogenic effects (recovery after deforestation) or continuous effects, for example under the conditions of anthropogenic pollution, are suggested. Author (ESA)

N83-12601# Toronto Univ. (Ontario). Inst. for Environmental Studies.

BASIC PRINCIPLES AND SITING CRITERIA FOR MULTIMEDIA MONITORING

R. E. Munn *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 15-20 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Objectives for designing a monitoring system are proposed. The need for identifying criteria relating to the efficacy of the system is stressed. Examples of the associated variables and processes which must be observed are given, including use of a surrogate substance (oceanic tritium) to monitor oceanic CO2. The necessity of ensuring the compatibility of time and space resolution for all components of the system is pointed out with particular reference to biological systems. The importance of selecting a site representative of an area is emphasized, including the need for reference stations in urban areas. Author (ESA)

N83-12602# Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Directorate of Fisheries Research.

INTEGRATED GLOBAL MONITORING OF THE ENVIRONMENT: POLICY AND PRINCIPLES

A. Preston (Dept. of the Environ., London) and G. N. J. Port *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 21-28 (For primary document see N83-12599

03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Global monitoring is defined. A distinction is made between target monitoring (for regulatory or control purposes), trend monitoring, and baseline monitoring. The need for global monitoring exists because pollutants cover the globe, because although localized, they have international consequences, and because international information sharing can be useful. Problems of global monitoring include defining monitoring sites, methods, parameters, quality control, and intercalibration. The goals of the Global Environmental Monitoring System are critizied as too ambitious and wide ranging, and that there is a lack of integration of the monitoring with other aspects of the assessment process.

Author (ESA)

N83-12603# United Nations Environment Program.
THE GLOBAL ENVIRONMENTAL MONITORING SYSTEM (GEMS): PRINCIPLES AND PROGRESS
M. D. Gwynne, F. Sella, and C. C. Wallen *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 29-35 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The place occupied by GEMS in the United Nations Environment Program is defined. A distinction is made between activities falling under GEMS by virtue of their international nature and those supported by the Environment Fund. The monitoring activities currently supported include climate related monitoring; monitoring of long range transport of pollutants; health related monitoring; terrestrial renewable resources monitoring; and ocean monitoring. Most activities have integral evaluation, review and training mechanisms. The programs are summarized, outlining operational goals and progress realized to date. The World Glacier Inventory and the Mediterranean pollution monitoring and research program are mentioned. Author (ESA)

N83-12604# World Meteorological Organization, Geneva (Switzerland).
THE WMO BACKGROUND AIR POLLUTION MONITORING NETWORK (BAPMON)
A. Koehler *In its* On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 37-47 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The objectives of the network include the establishment of baseline measurements of the global troposphere against which subsequent changes can be measured. The minimum program includes analysis of wet precipitation, observation of the aerosol optical depth, and sampling of suspended particulates. Standardization efforts have resulted in accuracies in rainwater samples to within 10%. Pollutant levels are shown for regional, urban and continental stations. The possibility of establishing median values for different modes of operation at a station (background and nonbackground mode) is examined. The interference of water vapor with CO2 measurements is discussed. Author (ESA)

N83-12605# Academy of Sciences (USSR), Moscow. Inst. of Evolutionary Morphology and Ecology of Animals.
MONITORING OF THE BIOSPHERE BIOLOGICAL COMPONENT
V. E. Sokolov and N. N. Smirnov *In* WMO On The Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 49-56 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The complexity of biological monitoring is brought out by citing the number of species found in various bodies of water in the USSR. The use of structural biocenotic indices for monitoring environmental changes is put forward. Functional indices of community performance include both physiological features of organism metabolism within the environment and the internal metabolism of the organism. Indices concerned with metabolism are of importance, e.g. for monitoring heavy metals in the environment by observing the damage they inflict on certain enzyme systems. Author (ESA)

N83-12606# Naval Arctic Research Lab., Barrow (Alaska).
BACKGROUND LEVELS AND BIOGEOCHEMICAL CYCLE OF CO2 IN THE ARCTIC. MULTIMEDIA MONITORING REQUIREMENTS
John J. Kelley *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 59-65 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The historical development of the monitoring of CO2 concentration in the atmosphere is traced, particularly for the Arctic. Long-term measurements in the Arctic show a secular increase of 1.2 ppm year by volume, and a seasonal oscillation in atmospheric CO2. In May and early June CO2 reaches very high concentrations at the ground surface, 1200 ppm, with soil temperatures at or below zero C. CO2 released from the surface first 30 cm of tundra soil ranges between 500 to 90,000 L per ha. Few measurements exist for CO2 concentrations in Arctic ice, seawater and surface water, but observations suggest that the frozen polar seas and lands may prove to be important sources and sinks for trace gases. Author (ESA)

N83-12607# Hydrometeorological Centre of the USSR (Moscow). Voeikov Main Geophysical Observatory.
PROBLEMS OF AIR POLLUTION MONITORING
M. E. Berlyand *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 67-73 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The development of the monitoring network for background measurements of air pollution in the USSR is noted. The use of paired stations, to aid in locating permanent sites as well as for determining the local component of background air pollution, is described. Thermoelectric actionometers with five glass filters are used to measure Shupp's turbidity coefficient for estimating extinction of solar radiation due to aerosols. Sampling and chemical analysis of precipitation uses methods developed during the International Geophysical Year. An intercomparison of meteorological instruments was carried out in the USSR in 1973 and 1978. The most stable actinometer was the Linke-Foisner device. Chemical analyses of precipitation made since 1958 in the USSR show increases in air pollution levels only in particular areas.

Author (ESA)

N83-12608# Hungarian Meteorological Society, Budapest.
ON THE SCALES OF DIFFERENT AIR POLLUTION PROCESSES
Dezso J. Szepesi *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 75-80 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

A synthesis of air pollution terms, such as background pollution, local and regional background pollution, is made in an overall framework with scales assigned in a consistent way. In this receptor-oriented system, air-pollution processes are defined as a function of distances upwind of the receptor. Background pollution from a larger-scale pollution process is superimposed on the polluting effect of the smaller-scale process, e.g. continental background plus the regional polluting effect give regional background pollution, etc. Receptor points for the measurement of concentration caused by a given scale pollution process should be located so as to ensure that they are not affected by other smaller scale processes. The ratios of the natural plus long-lived trace constitutents to the short-lived ones change considerably with increasing scales. Monthly mean sulphur dioxide and particulate sulphate concentrations show a variation of roughly two orders of magnitude, from the global to the local level. Author (ESA)

N83-12609# Hydrometeorological Centre of the USSR (Moscow). Lab. of Natural Environmental Monitoring and Climate.
MATERIAL ON THE BACKGROUND INTEGRATED MONITORING OF NATURAL ENVIRONMENTAL POLLUTION
F. Y. Rovinsky, I. A. Koloskov, Y. P. Cherkhanov, A. I. Vorontsov, and E. N. Rusina (Moscow State Univ.) *In* WMO On the Develop.

of Multimedia Monitoring of Environ. Pollution 1980 p 81-95 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Stations for monitoring background pollution levels within the Global Environmental Monitoring System in the USSR have been established in seven biosphere reserves. The location of station Borovoe, established in 1976, is shown. Data are given from samples of air, soil and vegetation taken in both adjacent and nearby areas. The impact of regional and local sources on the station is assessed. Sulfur dioxide, dust, mercury vapor, aerosol components of lead and cadmium, arsenic and 3,4-benzo (A) pyrene are presented as time variations of mean monthly concentrations in surface air. Actinometric observations (AT-50 instrument) show the low turbidity of the atmosphere. Some comparisons are shown with field background observations. Author (ESA)

N83-12610# Institute of Meteorology and Water Management, Warsaw (Poland).
MONITORING OF COMPLEMENTARY PARAMETERS INDISPENSABLE FOR INTERPRETATION AND USE OF DATA ON POLLUTION IN RAINFALL
Regina Hryniewicz *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 97-111 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Measurements are proposed which allow an estimation to be made of the gaseous pollutants absorbed in the air layer under clouds. Washout calculations of SO2 in the case of a motionless air column and for the case of continuous air influx are used to illustrate the technique. Measurements required inculde rainfall amount and duration, height of cloud base, mean wind velocity and prevailing direction during rainfall. Calculated and measured values of SO2 washout from a station in Poland in August are shown. Author (ESA)

N83-12611# Academy of Sciences (USSR), Moscow. Inst. of Chemical Physics.
OZONE PROBLEM IN CONNECTION WITH MONITORING THE STATE OF THE ATMOSPHERE
V. L. Talroze, I. K. Larin, and A. I. Poroikova *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 113-126 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Contributions of the oxygen, hydrogen, nitrogen and chlorine cycles to the global rate of ozone decomposition in the stratosphere are reviewed. A model for calculating the odd oxygen destruction chain length for the various cycles is discussed. Model results lead to the conclusion that satisfactory monitoring of the normal state of the ozonosphere can be realized through detection of the six minor pollutants participating in each cycle of O3 decomposition. Measuring the height profiles at many points over the earth with a frequency determined by their life time is necessary for O3, O, OH, HO2, NO2 (or NO), ClO (or Cl). Author (ESA)

N83-12612# Washington Univ., Seattle. Coll. of Fisheries.
CHEMICAL AND ISOTOPE ANALYSIS OF TRACE POLLUTANTS IN DIFFERENT ENVIRONMENTAL MEDIA
William R. Schell *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 127-154 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Radionuclide monitoring in three environmental systems is described and evaluated in the context of a biogeochemical cycle. The three systems involve monitoring :(1) globally, where fallout tracers are monitored worldwide, (2) regionally, where toxic metals in a fjord marine ecosystem are monitored in water, sediment, and biota, and (3) site specifically, where radionuclides produced by nuclear detonations in an atoll ecosystem are monitored in water, sediment, and biota. Tritium is used to study exchange processes across the tropopause and the processes of ocean mixing and transport. Lead 210 is used to gain insight into removal processes of particulate matter in the atmosphere and the mixed ocean layer. Sediment cores from Puget Sound, dated by Pb 210 - P0 210 techniques are used to study heavy metal pollution from sewage effluent, and the sedimentation rate caused by man's activities in the region. Monitoring of radionuclides in the food chain at the Bikini Atoll test site is described. The necessity of considering all of the sources and transport mechanisms is shown. Author (ESA)

N83-12613# Ministry of Agriculture, Fisheries and Food, Lowestoft (England). Fisheries Lab.
MARINE ENVIRONMENTAL MONITORING REQUIREMENTS: INTEGRATED GLOBAL MONITORING
A. Preston *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 155-160 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The origins of a global monitoring requirement in a marine context are examined. Priority requirements are discussed against the background of some present international initiatives. Strategies for meeting the more urgent requirements for marine monitoring are considered, especially in relation to regional needs. Regional activities are noted, and the needs for intercalibration, agreements on data handling, and training to derive maximum benefit internationally are pointed out. Author (ESA)

N83-12614# State Oceanographic Inst., Moscow (USSR).
MONITORING OF WORLD OCEAN POLLUTION
A. I. Siminov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 161-168 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO Geneva

The magnitude of the pollution of the surface microlayer of the world's oceans by petroleum hydrocarbons is discussed. The scientific basis for organizing a global ocean pollution monitoring effort is outlined. This includes study of the ocean dynamics which are involved in the fate of pollutants, the physical and chemical characteristics of the pollutants and the estimation of petroleum hydrocarbon accumulation, its effects on atmospheric pollution and on heat, moisture and gas exchange between ocean and atmosphere. A total of eight baseline stations in the Atlantic are enough to reveal the long-term variability of the background levels of the main pollutants. Author (ESA)

N83-12615# Department of Agriculture and Fisheries for Scotland, Aberdeen. Marine Lab.
PROGRESS IN THE STUDY OF CONTAMINATION EFFECTS IN THE MARINE ENVIRONMENT
A. D. McIntyre *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 167-177 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The drawbacks of monitoring pollution effects through toxicity tests are outlined, and the advantages of sublethal effects studies are presented. The use of studies of blood chemistry and enzyme activity and observations on the immune systems of fish and invertebrates are suggested as profitable avenues of research. Physiological effects are difficult to establish, while behavioral effects of some marine organisms can demonstrate pollution levels in the ppm range. Morphological effects such as gill membrane thickness in fish and growth alterations in colonial hydroids caused by small concentrations of heavy metals are cited. Population and community effects are studied through the means of tanks containing the organisms suspended in the sea and exposed to measured levels of contaminants. Suites of techniques are suggested for monitoring given contaminants. Author (ESA)

N83-12616# Hydrometeorological Centre of the USSR (Moscow). Hydrochemical Inst.
HYDROCHEMICAL OBSERVATIONS AT LAKE BAIKAL. PRESENT CONDITIONS
A. A. Matveyev and L. K. Sebach *In* WMO On the Develop. of Multimedia Monitoring in Environ. Pollution 1980 p 179-182 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Locations and schedules for measuring chemical concentrations in the major feed rivers and in the Baikal basin, and of atmospheric pollution deposition along the lake shore are presented. Additionally, extensive hydrochemical surveys are carried out three times a year. A continuous sampling of bottom sediments is taken along the southern border of the lake. Sampling of sediments in the central part of the lake is performed during field activities. Snow hydrochemical surveys were begun in 1972. ESA

N83-12617# Department of the Environment, London (England). Central Unit on Environmental Pollution.

INTEGRATED GLOBAL MONITORING OF THE ENVIRONMENT: PRACTICAL CONSIDERATIONS

G. N. J. Port *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 183-195 refs Original contains color illustrations (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Monitoring performed at public expense is judged by the value of the information it provides. The practical factors that influence the design, cost and effectiveness of monitoring programs with particular reference to national, international or global needs for environmental information are considered. Attention is often focussed on the technical difficulties of international monitoring rather than on the the use to be made of the information it provides. Ways in which the information required can be obtained most simply and cheaply and in a form relevant to environmental policy are illustrated. The calculation of emissions of smoke and sulfur dioxide from quantities and types of fuel burned is used as an example. Calculated data from the United Kingdom closely match observations. The effectiveness of monitoring critical areas rather than an entire system is shown through reference to shell fish consumption and river pollution surveys. Author (ESA)

N83-12618# Hydrometeorological Centre of the USSR (Moscow). Inst. of Applied Geophysics.

ON THE USSR NATIONAL SYSTEM OF OBSERVATIONS AND ASSESSMENT OF LONG RANGE TRANSPORT OF AIR POLLUTANTS

Y. A. Izrael, A. V. Lysak, I. M. Nazarov, A. Y. Pressman, and A. G. Ryaboshapko *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 197-203 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Participation of the USSR in the Cooperative Program for monitoring and evaluation of the long range transmission of air pollutants in Europe is described. Monitoring of transborder pollution transport is performed at seven ground stations near the western boundary. Sulfates are sampled from airborne particulates and from wet and dry deposition. Mathematical modeling of transborder pollution transport is emphasized in the Soviet program. A model is used in which the pollution flux across a 150 km boundary element is estimated from the superposition of continuous sources located at the nodes of a grid 150 km on a side. A time interval of 3 h is used for a 26 h analysis. A turbulent diffusion equation describes the concentration along the plume axis.

Author (ESA)

N83-12619# World Meteorological Organization, Geneva (Switzerland).

COMMENTS ON THE SPECIFICATIONS OF NETWORK STATIONS FOR MONITORING THE VARIABILITY OF ATMOSPHERIC TRACE CONSTITUENTS SIGNIFICANT FOR CLIMATE

Kirby J. Hanson *In its* On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 205-210 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

A program for measurement of some atmospheric trace constituents conducted by the National Oceanic and Atmospheric Administration (NOAA) is described. The trace gas and particle measurements are carried out at a four-station network, two in the northern hemisphere and two in the southern hemisphere. In each hemisphere there is one tropical and one polar station. They are located at (1) Barrow, Alaska, (2) Mauna Loa, Hawaii, (3) American Samoa, and (4) the geographical South Pole. Carbon dioxide concentrations are increasing at all stations, and FREON 11 at Mauna Loa observatory. An annual variation in condensation nuclei particles is seen, with no long term increase or decrease. The argument is put forward that it is misleading to use the terms background or baseline as they imply the existence of an undefined atmospheric physical state. Whether such states exist for trace constituents has not yet been established. Author (ESA)

N83-12620# Hydrometeorological Centre of the USSR (Moscow). Inst. of Applied Geophysics.

AIRCRAFT AND REMOTE MEASUREMENTS OF ATMOSPHERIC TRANSPORT OF POLLUTANTS WITHIN THE GLOBAL INTEGRATED MONITORING SYSTEM

V. A. Ionov, I. M. Nazarov, and S. D. Fridman *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 211-217 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The value of aircraft sampling for obtaining data on circulation and transport of air pollutants for determinations of concentrations is pointed out. Active remote sensing techniques using lasers, and passive methods using the Sun or the studied gas itself as electromagnetic radiation sources are mentioned. The concentration field of mercury vapor was investigated over the USSR and adjacent seas, and concentrations of sulfates from industrial sources and the eruption of the Tolbachik volcano in 1975 were studied partly through aircraft sampling. Maximum sulfate concentrations observed at altitudes near the 850 to 925 mb surfaces show the necessity for data exchange using the 925 mb level.

Author (ESA)

N83-12621# Meteorologisches Observatorium, Radebeul (East Germany).

ON THE SPATIAL INTERPOLATION OF AIR POLLUTION FIELDS

Manfred Zier *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 219-229 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Air pollution fields are considered as inhomogeneous, anisotropic random fields. Using quantiles of the cumulative frequency distribution of measuring data as characteristic parameters, the space and time structure of these fields are described by means of special correlation parameters. Such correlation parameters are used in a spatial interpolation method for determining the long term mean value of air pollution in a point apart from measuring stations, using short time series from this point and the measuring points and the long term mean values of the measuring points. The method is illustrated by gravimetric measurement of suspended dust from the air pollution measuring network of East Germany. The interpolation errors are discussed and compared with those of a regression interpolation method. Accuracies are approximately equal. Author (ESA)

N83-12622# Scientific Center of the Natural Environment and Water Resources Protection (Bulgaria). Committee of Natural Environment Protection.

SOME PRINCIPLES OF THE INTERACTION OF A GLOBAL MONITORING SYSTEM WITH NATIONAL AND REGIONAL NATURAL ENVIRONMENT POLLUTION OBSERVATION AND INFORMATION SYSTEMS

B. Uzunov and I. Iliev *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 231-239 (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

European efforts to monitor air and water pollution are outlined. Automatic monitoring stations are in use in several countries. Objectives for regional and global monitoring systems differ in that while a global monitoring system collects information on the background biosphere state in general and in individual natural zones where an anthropogenic effect is negligible, regional and national systems of observation and control present information on the environment pollution by industrial enterprises. For this

reason requirements for background regional stations of the global system are completely different from those of stations for the control of pollution caused by human activity. Background stations must be located in regions where within a radius of 100 km no economic activity is planned for 50 years, whereas for regional stations this radius is from 30 to 60 km. Observational stations for national systems should be located in regions where it is mostly convenient to obtain comprehensive, objective information on pollution caused by certain industrial plants. Author (ESA)

N83-12623# Academy of Sciences (USSR), Moscow. Inst. of Agrochemistry and Soil Science.
STUDY OF POLLUTANT MIGRATION AND TRANSFORMATION
V. A. Kovda and A. S. Kerzhentsev *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 243-248 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy at available at WMO, Geneva

A monitoring network must account for the pollutants as they pass through five different localities in the environment : (1) emission area, the source of pollution, (2) impact area, the area of direct impact of the pollution source, (3) background area, the area beyond the direct impact of local pollution sources, (4) the area of pollutants contact with ground objects within the limits of impact of background areas, and (5) the area of biological migration and transformation of pollutant trophic chains. Balance methods of calculation may be used for measurements in the first stage. Diffusion fields may be calculated from point source measurements allowing for meteorological parameters, in stage 2. Bioassay techniques for assessing pollutant impact on ecosystems includes study of species composition of lichens and soil invertebrates. Author (ESA)

N83-12624# State Hydrological Inst. (USSR).
ON POSSIBLE CHANGES OF THE GLOBAL CLIMATE
M. I. Budyko *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 249-255 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Atmospheric model results using CO2 values projected to the year 2025 (0.052 to 0.064 %) show an increase of mean temperature sufficient to convert part of the arctic ice cap to annual ice. Air temperatures at high latitudes will increase 10 to 15 C in summer and by 15 to 20 C in winter. The resulting climate change is compared to the Neogene epoch, using paleoclimatological data and a general circulation model. The main geobotanical zones are shifted by 10 to 15 deg north. Air temperatures during the coldest month of the year are not below zero C, over all Europe and most of Asia. Precipitation distribution in Europe and Asia is similar to present conditions, but amounts are appreciably higher.
Author (ESA)

N83-12625# Council on Environmental Quality, Washington, D.C.
USE OF RIVER BASIN WATER QUALITY MONITORING DATA TO ANALYZE HEAVY METAL INPUT TO THE MARINE ENVIRONMENT
John D. Buffington, Laurence J. Milask, Carol Graves, and Steve Fullerton *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 257-280 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The suitability of using available water quality monitoring data to assess continental contributions of pollutants to ocean systems, and to investigate trends in pollutant levels for major waterways, is demonstrated. Data on heavy metals in 108 U.S. river systems in coastal basins were screened. It is indicated that estuarine waters of the Atlantic Ocean receive the majority of the total U.S. contribution for mercury and chromium measures. Pacific coast waters receive the major percentage of copper, cadmium, lead, arsenic, and iron; the Gulf of Mexico receives the largest percentage of the total U.S. contribution for selenium. Trends of iron and mercury concentrations in the Delaware River were investigated. Results indicate that iron concentrations in the Delaware River increase from upstream to downstream stations. Mercury concentrations are fairly constant for all but one station, indicating a possible point source of pollution for this metal. Time trends show that iron concentrations are increasing while mercury concentrations are decreasing in the Delaware River.
Author (ESA)

N83-12626# Hydrometeorological Centre of the USSR (Moscow). Hydrochemical Inst.
PROBLEMS OF BACKGROUND MONITORING OF SURFACE WATERS
V. T. Kaplin, T. H. Kolesnikova, and A. A. Ivanova *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 281-286 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The activities of the all-union service of observations and control of the pollution level of environmental objects (AUSOC) in the USSR are described. Included are two networks; one for background observation of land surface water quality, the other for land water pollution control. Automatic stations monitor pH, redox potential, conductivity, water temperature, dissolved oxygen, suspended matter, H2S, copper ions and water level. The information is used for early notification of important changes in surface water quality, monitoring the efficiency of water protection measures and regulating surface water quality through regional planning of industrial activity. Author (ESA)

N83-12627# Akademiya Meditsinskikh Nauk SSSR, Moscow. Oncologic Scientific Center.
INPUT OF CHEMICAL CARCINOGENS POLYCYCLIC AROMATIC HYDROCARBONS (PAH) TO THE ATMOSPHERE AND THEIR CIRCULATION IN THE ENVIRONMENT
L. M. Shabad *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 287-297 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Concentration studies of benzo (a) pyrene (BP), an indicator for the whole group of PAH's, were surveyed for the USSR. Since the modernization of some industrial processes and home heating systems, the greatest concentrations are produced by internal combustion engines. Soil samples in remote regions contain up to 5 micrograms/kg of dry soil. Synthesis of BP in green plants is possible and volcanic ash samples show high concentrations. Water reservoir pollution by motor boats is established. Concentrations of 1 microgram/kg are shown in fish. Maximum permissible concentrations of 15 grams/100sq m for BP in air and working places, 0.1 micrograms/100 sq m in the air of populated locations, and 0.005 micrograms/2 for fresh water reservoirs were investigated. Author (ESA)

N83-12628# Academy of Sciences of the Lithuanian SSR, Vilnius. Inst. of Physics.
ON THE MECHANISMS OF THE DEPOSITION OF ATMOSPHERIIC ADMIXTURES TO THE GROUND SURFACE
B. I. Styro and K. K. Shopauskas *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 299-307 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Dry and wet deposition and determination of concentrations due to moisture and turbulent diffusion are surveyed. An equation for estimating deposition based on known concentrations in the atmosphere is given. Deposition velocities are shown for SO2, NH3, H2O, HCl, NO2, SO2, and SO3. Data are given for polonium 210, benzo (a) pyrene, iron, aluminum, molybdenum, lead and copper. The percent of monthly dry deposition of metals can vary from 0% to 90% depending on the amount of precipitation and intensity of the source. Radioactive admixtures can be used to study the relationship between dry and wet fallout. Radon decay products are bound to the submicron fraction of aerosols.
Author (ESA)

N83-12629# Kombinat VEB Chemische Werke Buna (West Germany).
NUMERICAL SIMULATION OF AIR POLLUTANT SPREADING

PROCESSES BY TRANSPORT EQUATION
R. Schenck and U. Andrasch (Inst. fuer Wasserwirtsch.) *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 309-324 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The solution of the differential equations most commonly used for modeling pollution transport processes is discussed. All the methods are based on wind field data at different levels and a semiempirical representation of turbulence. A spliting scheme is illustrated with the four equations being solved by matrix factorization. The block diagram of the solution algorithm is given. Methods for calculating pollutant fluxes across boundaries and the annual mean values of emissions are shown. Use of the method for calculating long range transport over Europe is presented.
Author (ESA)

N83-12630# Bedford Inst. of Oceanography, Dartmouth (Nova Scotia). Atlantic Oceanographic Lab.
BACKGROUND LEVELS AND ENVIRONMENTAL CYCLING OF PETROLEUM HYDROCARBONS: MULTIMEDIA MONITORING REQUIREMENTS
E. M. Levy *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 325-351 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The cycling of petroleum in the environment is discussed and the present state of knowledge concerning the distribution of petroleum pollution in the marine atmosphere, on the surface of the ocean, in the water column, and in marine organisms and sediments is reviewed. Measurements of concentrations of petroleum in the surface microlayer are presented. Tar distributions are highly variable with insufficient sampling preventing generalization. Observations of dissolved or dispersed petroleum residues suggest that there is a background of a few micrograms per liter over much of the Atlantic, Pacific and Indian oceans, with somewhat higher concentrations in the Mediterranean and Baltic seas. Distributions of hydrocarbons in marine organisms are difficult to determine since some organisms produce n-paraffins naturally.
Author (ESA)

N83-12631# Hamburg Univ. (West Germany). Geological-Paleontological Inst.
THE EVOLUTION OF CARBON DIOXIDE
Egon T. Degens and Stephen Kempe *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 353-372 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Environmental parameters that control the CO2 system in the past and present are discussed. Mantle and crustal evolution is the dynamo recharging the CO2 in sea and air; present rate of CO2 release from the upper mantle and crust is about 0.06 x 10 to the 15th power g C per year. Due to the enormous buffer capacity of the chemical system of the ocean, such rates are too small to seriously affect the level of CO2 in the atmosphere. It is concluded that the CO2 content in the atmosphere has remained fairly uniform since early Precambrian time; CO2 should thus have had little impact on paleoclimate. In contrast, the massive discharge of man made CO2 into the atmosphere in the amount of 10 x 10 to the 15th power g C per year may have serious consequences for climate, environment and society. Author (ESA)

N83-12632# Imperial Coll. Field Station, Ascot (England).
MONITORING REQUIREMENTS FOR BIOLOGICAL SYSTEMS
J. R. Thompson and J. F. Farrar (University Coll. of North Wales, Bangor) *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 375-394 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The biological objectives for a program of global monitoring are stated: (1) to assess what atmospheric variables (especially chemical) need to be monitored; (2) to determine what measurements (particularly chemical) in soils, water and biota, and what biological performance measurements, are needed to indicate environmental or ecosystem states and trends; and (3) to assess what can be predicted in biological terms from such knowledge. Proposed measurements include; SO2, O3, NOX, particulates, SO4, NH4, C2H2, and CO2. Target organisms would be used for organic compounds. Measurements in media other than the atmosphere would include pH, nitrates, nitrites and phosphates. The use of Bel-W3 tobacco plants to monitor ozone concentrations is suggested. Author (ESA)

N83-12633# Hydrometeorological Centre of the USSR (Moscow). Lab. of Natural Environmental Monitoring and Climate.
DETERMINATION OF BIOTA RESPONSES TO ANTHROPOGENIC IMPACTS IN THE SYSTEM OF BACKGROUND MONITORING
L. M. Filippova, G. E. Insarov, F. N. Semevsky, and S. M. Semyonov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 395-407 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Mathematical modeling is proposed as the optimum way to predict biota state changes in a natural ecosystem in response to pollution levels. Models are proposed that take into account the adaptation of population individuals in the ecosystem by the principle of optimality. The functioning of the natural selection mechanisms maximizes the mean geometrical (in time) of the intrinsic rate of increase of an individual of a stable species. Ecosystem dynamics are described by a system of difference equations for the numbers of species populations in the ecosystem. Due to the principle of optimality, real ecological parameters of individuals are such that they provide local maxima to the adaptation function measured by the value of the intrinsic rate of increase. The value of the intrinsic rate of increase in points of maximum is one. Gas resistance of 400 species of woody plants illustrates the modeling techniques. Author (ESA)

N83-12634# Nature Conservatory Council, London (England).
GLOBAL MONITORING: RELEVANT EXPERIENCE WITH CHEMICAL AND BIOLOGICAL MONITORING IN RELATION TO WILDLIFE IN THE UNITED KINGDOM
N. W. Moore *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 409-413 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

An historical summary is given of the ways in which different aspects of pesticide hazards have been brought to the attention of the scientific and governmental communities in the United Kingdom. The effects of the entry of ddt, aldrin, heptachlor, polychlorobiphenyls and other substances into the food chain were detected by observant layman. A monitoring system would not have identified the problems. Since the 1960's with the phasing out of organochlorine pesticides, population counts of birds of prey have been conducted to monitor the results of these restrictions. Population increases are noted in all species known to have been affected. Routine recording of the distribution and populations of organisms is promoted as a part of a global monitoring program for pollutants. Author (ESA)

N83-12635# State Oceanographic Inst., Moscow (USSR).
SCIENTIFIC ASPECTS OF THE ORGANIZATION OF BIOLOGICAL MONITORING OF THE BALTIC SEA ECOSYSTEM STATE
A. V. Tsyban *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 415-424 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Criteria for the selection of biological indicators are listed. At the level of organisms, indicators must combine morphological, ethnological, biochemical, physiological and genetic characteristics that are peculiar and ecologically important for the species. At the population biocenotic level biological indicators must combine structural and functional indicators. The understanding of biological consequences of marine ecosystem pollution involves the determination of species diversity indexes, the use of produc-

tion destruction characteristics, the use of microbiological indices and the use of indicator forms of hydrobionts. Data from two ecosystem studies of the Baltic Sea are summarized. In the area of photosynthesis, the degradation of organic matter is 2 to 5 times higher than its production due to algae. Microorganisms that destroy paraffin, chlorinated and aromatic hydrocarbons are widely distributed in the open Baltic. Author (ESA)

N83-12636# Ministry of Agriculture, Moscow (USSR). Central Scientific Research Lab. of Nature Protection.

ORGANOCHLORINE PESTICIDES IN ORGANISMS OF WILD ANIMALS OF TERRESTRIAL ECOSYSTEMS

E. E. Syroechkovsky and A. V. Denisova *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 425-429 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Pesticide levels were measured in the tissue of birds and mammals in nonagricultural areas of the USSR to determine background levels. The examination of more than 400 samples of organs and tissues of 40 species of animals of terrestrial ecosystems belonging to different natural zones revealed that in those regions, where the application of pesticides is limited or it is of local or temporary character, wild animals associated by their habitat exclusively with anthropogenic areas are contaminated with these chemicals. In the Amur Region in the vicinity of the Baikal-Amur trunk-line, internal organs and tissues of both warm-blooded and cold-blooded vertebrates of 20 species were studied. No organochlorine pesticides were found in samples. In the mountain steppe region of Tuva pesticide residues were identified in 30% of the samples taken from animals higher in the food chain. Author (ESA)

N83-12637# Budapest Science Univ. (Hungary). Dept. of Plant Anatomy.

A NEW METHOD FOR STUDY OF INJURIOUS EFFECT OF DUST POLLUTION ON LEAVES

K. M. Nyomarky and J. Szasz *In* WMO On the Develop.. of Multimedia Monitoring of Environ. Pollution 1980 p 431-436 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Polluted leaf samples of Acer negundo and Acer platanoides were collected from plants grown in industrial areas of Budapest. At the same time leaves of the chosen species were collected from plants grown at an experimental station. These were used as controls. The plant species used for sampling were at the same development stage. The leaf samples were subjected to light microscopic and scanning electronmicroscopic observations. An active stomatal index was derived, using the number of stomata and epidermal cells per mm of leaf area, and the number of dust clogged stomata per mm of leaf area. Data are shown illustrating use of the index to assess the effects of dust pollution.

Author (ESA)

N83-12638# California Univ., Bodega Bay. Bodega Marine Lab.

CHANGES IN THE LEVELS OF DDE AND POLYCHLORINTED BIPHENYL (PCB) CONTAMINATION OF CALIFORNIA COASTAL WATERS, 1971 - 1977: USE OF THE MUSSEL, MYTILUS CALIFORNIANUS, AS AN INDICATOR SPECIES

Brock W. deLappe, Robert W. Riseborough, and David R. Young (Southern California Coastal Water Res. Project) *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 437-448 refs Sponsored in cooperation with Southern California Coastal Water Research Project, EPA, California State Water Resources Control Board and California Dept. of Fish and Game (For primary document see N83-12599 03-45)

(Grant NSF GX-32885)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Use of the mussel, Mytilus californianus, as an indicator of levels of organochlorine pollution in the California marine environment show that levels of DDE have declined by an order of magnitude since 1971 when the survey was initiated. PCB levels also declined, although the magnitude of the decline is somewhat more variable, ranging from a factor of about three up to an order of magnitude. Detection and measurements of changes of less than an order of magnitude would require that attention be paid to the determination of analytical and sampling variance. It is recommended that the aims and purposes of such monitoring programs be clearly defined in advance before projects are initiated. Author (ESA)

N83-12639# Academy of Sciences of the Latvian SSR, Riga. Inst. of Biology.

STUDY OF POLLUTANT IMPACT ON FRESHWATER ECOSYSTEMS

G. P. Andrushaitus and P. A. Tsydmin *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 449-454 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The effects of pollutant concentrations on the physical and chemical characteristics of streams and the resulting eutrophication are reviewed. Runoff from a watershed and large amounts of discharged organic pollutants which cannot be assimilated and decomposed by biological self-purification processes result in the silting and overgrowing of streams, accumulation of pollutants in water and bottom sediments. The most important effect of pollution appears as a decrease of hydrobiont diversity and simplification of biocenotic structure, i.e., a low ratio of hydrobiont species number to specimen number in a simplified food web. Pollution results in an allogenic succession, the change of river biocenoses from oligosaprobic to polysaprobic ones, during which hydrobiont diversity and biomass decrease to such a degree that the stretch of the river becomes practically azoic. Biological self-purification is unable to completely restore the initial background state of the river and it stops under the conditions of saprobity which is one to two levels higher than the background. Author (ESA)

N83-12640# Hydrometeorological Centre of the USSR (Moscow). Inst. of Experimental Meteorology.

STUDY OF POLLUTANT MIGRATION PROCESSES IN THE SOIL-PLANT, SOIL-WATER SYSTEM

V. A. Borzilov and S. G. Malakhov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 457-460 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Mathematical modeling of migration processes is discussed. Annual runoff coefficients, are given for DDT, lindane, lead, and mercury sulfates for the Moscow river basin and for small runoff plots. The process of pollutant penetration into a plant from the soil includes pollutant transport through the soil profile to the root layer and root surface, and penetration through the root surface and transport within the plant. The problem amounts to the solution of a convective diffusion equation in two media, soil and plant. The accumulation coefficient determined in the ordinary way (as a ratio of pollutant concentration in a plant to its average concentration in soil) depends on the course of the process at both stages and therefore is not suitable for prediction, since it is dependent not only on plant properties but also on pollutant migration capacity in soil. Parameterization of pollutant penetration through the root surface can be done using the assumption that penetration is determined by the intensity of soil water intake by the plant.

Author (ESA)

N83-12641# Academy of Sciences (USSR), Moscow. Pacific Ocean Inst. of the Geography of Far East Scientific Center.

CYCLES OF HEAVY METAL MIGRATION IN ECOSYSTEMS OF THE SIKHOTE-ALIN BIOSPHERIC REGION

Y. P. Badenkov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 461-467 refs (For primary document see N83-12599 03-45)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The reserve has regions of development on its periphery (mining, forestry, agriculture, fisheries). The processes of heavy metal transformation in the vegetation soil system are investigated on four small watersheds equipped with precipitation collectors and lysimeters which have been operating for several years. Background levels in soil and plants are shown for Pb, Cd, Zn

and Cu. Plants mostly accumulate cadmium and lead. Enrichment of the surface soil layer in heavy metals is due to dust deposition. Silver, cadmium, copper, and lead are effectively accumulated in the humic layer, which is not so with zinc. These data are contrasted with concentrations found in 30 rivers in the basin of the Sea of Japan. Redistribution of heavy metals takes place with their partial accumulation in bay sediments and dissipation in the open sea.
Author (ESA)

N83-12642# Ministry of Agriculture, Moscow (USSR). Central Scientific Research Lab. for Nature Protection.
STUDY OF WILD ANIMAL POLLUTION BY PESTICIDES: METHODOLOGICAL ASPECTS
L. D. Voronova and A. V. Denisova *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 469-472 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Complementary laboratory experiments and field studies of pesticide effects are addressed. Topics discussed include research of transport and persistence of pesticides in biogeocenosis, their migration along trophic chains, distribution in different organs and tissues of animals inhabiting treated (before and after the treatment) and nontreated (control) territories, disturbance of behavior, response of animals, as well as functional and morphological changes in their organisms. Changes in the dynamics of population structure (number, sexual, age composition) resulting from both the acute effect of pesticides and the chronic effect of pesticides are also suggested for study. The importance of studying populations for several generations is emphasized. The effects of low toxic sevin, which was tested in different natural zones on mammal populations (red mouse, large-toothed souslik, etc.), are noticeable a year after its application. Its effect is enhanced 2 or 3 years after treatment. Author (ESA)

N83-12643# Academy of Sciences (USSR), Moscow. Inst. of Agrochemistry and Soil Science.
A STUDY OF VOLATILITY, CONTENT DYNAMICS AND TRANSFORMATION OF PRIORITY POLLUTANTS IN ATMOSPHERIC AND AQUATIC ENVIRONMENTS
B. P. Strekozov, G. K. Gryzlova, A. L. Chimishkyan (Moscow Chemico-Technological Inst.), B. Kostovska (Inst. of Agrotechniques, Fertilizers and Pedology, Poland), Y. Rolya (Inst. of Agrotechniques, Fertilizers and Pedology, Poland), E. Sadovsky (Inst. of Agrotechniques, Fertilizers and Pedology, Poland), and G. Manyara (Inst. of Agrotechniques, Fertilizers and Pedology, Poland) *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 473-475 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Laboratory and field studies relating to the stability of several herbicides and their decomposition products are summarized. Herbicides Linuron, 2,4-D, MCPA, molynat, arezin, propanide and their decomposition products: chlorinated anilines (3,4-dichloroaniline-3,4-DCA, 3-chloroaniline-3-CA and 4-chloroaniline-4-CA), phenols (2,4-dichlorophenol-2,4-DCP and 2-methyl-4-chlorophenol-MCPAP) and hexamethylenymine (HMY) are used to consider processes such as volatilization, photolysis, decomposition of the compounds in air and water and migration in soil. Volatility of the compounds under static conditions was determined from the decrease of the compound mass in glass bottles over polyethylene glycol. Studies were conducted on chernozems, grey forest and meadow chernozem soils to determine biotic and abiotic degradation. Sea and surface water experiments are cited.
Author (ESA)

N83-12644# Academy of Sciences (USSR), Moscow. Inst. of Botany.
DEVELOPMENTAL DEFECTS OF PLANTS AS TESTS IN MONITORING ENVIRONMENTAL POLLUTION
E. I. Slepyan *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 477-480 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The deviations of the development of plant organs and tissues from the normal caused by pollutant impact are listed. Diagnostically significant developmental defects of plant organs caused by pollutants include suppression of growth, structural undervelopment, dwarfism or giantism, changes in number of organs, deformation, and changes in sexual characteristics. Examples of defects occurring in plants studied in the USSR are enumerated. The most complicated developmental defects are caused by those pollutants characterized by mutagenic, teraogenic, blastomogenic, biostimulatory, toxicogenic and genomoptimizing activities. Analysis of plants from some spatially isolated floras (e.g., the Sakhalin Island flora) suggests that individual teratomorphic mutations can give certain selective advantages to some organisms, affecting the process of microrevolution. This is suggested to have prognostic valve for pollutant monitoring.
Author (ESA)

N83-12645# Hydrometeorological Centre of the USSR (Moscow). Hydrochemical Inst.
USE OF NONSPECIFIC RESPONSE OF AQUATIC POPULATIONS TO THE IMPACT OF POLLUTANTS AS A MONITORING SYSTEM
N. M. Trunov, P. I. Korolenko, and L. V. Brazhnikova *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 481-483 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Nonspecific intracellular changes include decreases in dispersity of cytoplasm and nucleus colloids, increase of cytoplasm viscosity, increase of cytoplasm and nucleus affinity to a dye; change in cellular permeability; increase of cytoplasm acidity and change of capability for granule formation. The use of dyes for objective quantitative evaluation of nonspecific effects is proposed, using microfluorometric methods. A dye such as acridin orange fluorochrom concentrates within lysosomes and is characterized by bright red luminescence, while acridin orange distributed diffusely within the cell makes structures of the nuclei and cytoplasm luminesce green. Any influence causing stimulation or depression of lysosome cell leads to the change of the ratio between two major components of the cell luminescence spectrum red and green. This ratio can be easily measured by means of a simple fluorometric unit for the luminescent microscope with a photomultiplier and light filters. Author (ESA)

N83-12646# Hydrometeorological Centre of the USSR (Moscow). Voeikov Main Geophysical Observatory.
BACKGROUND PARAMETERS OF ATMOSPHERIC PRECIPITATION CHEMICAL COMPOSITION AS SITING CRITERIA FOR GLOBAL MONITORING STATIONS
E. S. Selezneva *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 485-489 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

A method for obtaining background values of chemical pollutants in precipitation by analyzing concentration variabilities at two stations is shown. Long series of samples from a station near a pollution source and another at a greater distance are used. Comparisons with samples taken during intensive precipitation lasting for a long period of time when the lower atmospheric layer is washed out, illustrate the validity of the method. Distribution of pollution concentrations over the USSR are shown to be arranged zonally (northern, middle, and southern) with the backgroung of ion concentrations ranging from 3 to 8 mg/l. The average contribution of the background to the total composition of precipitation is 20 to 25% and decreases to 10 to 15% in polluted areas. Author (ESA)

N83-12647# Hydrometeorological Centre of the USSR (Moscow). Voeikov Main Geophysical Observatory.
RESEARCH ON THE CHEMICAL COMPOSITION OF PRECIPITATION AT BACKGROUND STATIONS
O. P. Petrenchuk *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 491-496 refs (For primary

document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

In the USSR systematic investigations of precipitation chemical composition were begun in 1957 and precipitation sampling is carried out at present by a network of 70 stations. Five regional and one baseline station have met the requirements of the WMO program since 1973. Precipitation samples are collected at these stations and the content of SO4(-), Cl(-), NO3(-), HCO3(-), NH4(+), Na(+), Ca(2+), and K(+) ions are determined. Annual mean values of precipitation mineralization for five stations of which Siltivkar, Turukhansk, Kaunas are the background stations are shown to range from 6 to 12 mg/l. In the western USSR precipitation mineralization has increased significantly in the past 15 years (15 mg/l to 36 mg/l in Kaunas) Investigations of the content of soluble constituent in the water of frontal precipitating clouds averages 6 mg/l over the USSR. Author (ESA)

N83-12648# Hydrometeorological Centre of the USSR (Moscow). Voeikov Main Geophysical Observatory.
MONITORING OF METEOROLOGICAL ELEMENTS IN A COMPOSITE PROGRAM FOR ENVIRONMENTAL POLLUTION STUDIES
N. A. Petrov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 497-506 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The need for meteorological observations for the assessment and prediction of pollution dispersion and for measuring the impact of pollution on weather and climate is examined. Methods using spatial comparison can be used for studying mesoscale phenomena, such as the influence of a large city on weather and climate. Methods of temporal comparison, when atmospheric response before and after the event are appropriate for analyses of severe short-term events, such as volcanic eruptions are given. Remaining problems to be solved as part of environmental monitoring efforts include: (1) optimal unification and task distribution in the information acquisition between individual observing subsystems (ground based, satellites, aircraft, etc.); (2) development of new measuring techniques, especially for radiation characteristics, and their metrological maintenance; (3) establishment of subsystems for data collection, processing and retrieval; and (4) development of scientific guidance for the observing systems and techniques.
Author (ESA)

N83-12649# Hydrometeorological Centre of the USSR (Moscow). Lab. of Natural Environmental Monitoring and Climate.
METHODS FOR BACKGROUND MONITORING OF POLLUTANTS IN NATURAL MEDIA
F. Y. Rovinsky, M. M. Novikov, B. V. Pastukhov, and T. A. Teplitskaya (Moscow State Univ.) *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 501-506 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The analytical techniques used to monitor dust, sulfur dioxide, mercury, lead, cadmium, arsenic and 3, 4-benzo (a) pyrene at the Borovoe station are given. Dust concentrations are determined by weighing fiber filters (FPA-15-2.0) in air flow rates of 20 to 85 cu m/h. A modified West-Gaecke technique using an impregnated solid carier is used for SO2 determination. Atomic absorption is used for heavy metals. Mercury in air is determined by preconcentrating through amalgam formation with gold, silver or copper. Methods for polycyclic aromatic hydrocarbon (PAH) determination are based on low temperature (77 K) fine structure luminescence spectroscopy. The content of 3,4 benzo (a) pyrene ranges from 0.001 to .05 micrograms/100 cu m air. Background values for heavy metals in air, precipitation water, bottom sediments, soil and plants are given. Author (ESA)

N83-12650# Hydrometeorological Centre of the USSR (Moscow). Inst. of Experimental Meteorology.
INSTRUMENTS AND METHODS FOR MONITORING BACKGROUND SOIL POLLUTION
E. Babkina, G. Belov, T. Bobovnikova, E. Virchenko, Y. Gaziev, S. Malakhov, E. Makhonko, L. Nazarov, and A. Shilina *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 507-570 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Airborne instruments used for aerosol sampling in the troposphere include an airlock aerosol sampler Vega-I and a three-stage impactor IFAZ with outlet filter. Measurements are made at flight heights between 0.5 and 10 km. Volumetric sampler output at the indicated speed of the aircraft of 350 km/hr amounts to 160 and 230 cu m/hr at heights of 0.5 and 10 km for Vega-I and for IFAZ impactor 470 and 720 cum/hr respectively. A multistage impactor which can obtain nine dispersed phases of aerosols is used for surface aerosol sampling. Pesticides are sampled on slides impregnated with ethylene glycol. Soil sampling is carried out using the method of soil geochemical profiles, i.e., a narrow soil section stretched in one direction that crosses different elements of relief and biogeocenoses. Gas chromatography, atomic absorption spectroscopy and neutron activation are used for trace element determination. Author (ESA)

N83-12651# Hydrometeorological Centre of the USSR (Moscow). Inst. of Applied Geophysics.
CIRCULATION MODELS OF POLLUTANTS (HEAVY METALS AND PESTICIDES) BETWEEN GEOPHYSICAL MEDIA
V. M. Koropalov and A. K. Ostromogilsky *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 511-516 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

A balance model containing modules for the atmosphere over land and ocean separately, land surface, ocean mixing layer and deep ocean is proposed. The anthropogenic contribution to background concentrations in soil and sea water is assumed to be small and estimates using 1970 data are made. Organochlorine admixtures entering the oceanic atmospheric with continental air masses are assumed to be partially in the vapor phase and partially bound to aerosols. A model run showing atmosphere to ocean organic admixture vapor flux is illustrated. Calculation results show that for DDT and PCB, while admixture vapor flux is directed from the ocean to the atmosphere, the total flux (vapor + aerosol) is directed from the atmosphere to the ocean. The model has been used for optimizing pesticide application. Author (ESA)

N83-12652# Hydrometeorological Centre of the USSR (Moscow). Lab. of Natural Environmental Monitoring and Climate.
MATHEMATICAL BASES FOR MODELING EXOGENIC SUCCESSION
S. M. Semyonov *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 517-519 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

A general structure for models for predicting exogenic succession is suggested for ecological modeling. The space of biological species individuals is parameterized by the elements of a certain set A. Vector components possess a definite ecological meaning, since they characterize the interaction of an individual with predators, rivals, food, environmental abiotic factors, etc. The ecosystem state as a whole is described by the sum total of three vectors for the number of individuals in a biological community belonging to the population of a species, abiotic compartment characteristics that depend on the ecosystem biotic component and exogenic abiotic variables, such as solar radiation. Ecosystem state change dynamics are described in general form by a set of differential equations. A value similar to the value of the mean fitness of an individual of a species is used to characterize asymptotically stable bounded solutions to the equations. The obtained necessary condition of limitation and asymptotic stability considerably simplifies the problem of finding the ecosystem state dynamics changes arising in response to exogenous parameter changes. Author (ESA)

N83-12653# Academy of Sciences (USSR), Irkutsk. Limnological Inst.
ON SOME PECULARITIES OF DIFFUSION MODELS IN

INHOMOGENEOUS MEDIA
L. M. Galkin *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 521-524 (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

A model is presented for the diffusion of a pollutant in an inhomogeneous medium under the assumption that the motion of the pollutant particles is a Markov process. A hierarchy of approximations may be obtained for the mean particle flux. The first order is somewhat akin to the Boussinesq approximation. The second order includes explicit dependence on stratification mean velocity and molecular viscosity of the medium. It is held to be more convenient to consider net diffusion as consisting of one part which arises from discrete particles, and a second part from the dissolved impurities, rather than resulting from molecular and turbulent diffusion. Author (ESA)

N83-12654# State Hydrological Inst. (USSR).
HYDROLOGICAL ASPECTS OF WATER QUALITY MONITORING UNDER THE CONDITIONS OF ANTHROPOGENIC IMPACT
A. V. Karaushev and B. G. Skalalsky *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 525-528 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The monitoring of pollutants in surface waters involves a properly distributed observational network which provides: (1) priority for anthropogenic impact control, (2) systematic and integrated observations, and (3) real time reception and transmission of information. Parallel studies are made of polluted and nonpolluted rivers to obtain reliable estimates of the anthropogenic water quality factor. Integral indices recommended for generalizing data on individual pollutants include: mean annual concentration of the limiting substance or substances in the observational range; indices of relative duration of polluted and clean run off (according to maximum permissible concentration criteria); indices of relative volumes of polluted and clean runoff; relative indices of pollution area size; and level of total load of the limiting substance in a lake or reservoir. Author (ESA)

N83-12655# Hydrometeorological Centre of the USSR (Moscow). Voeikov Main Geophysical Observatory.
APPLICATION OF THIN FILM SOLID SORBENTS FOR ESTIMATION OF SO2 BACKGROUND CONCENTRATIONS
N. S. Volberg and Z. G. Tulchinskaya *In* WMO On the Develop. of Multimedia Monitoring of Environ. Pollution 1980 p 529-532 refs (For primary document see N83-12599 03-45)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Sampling tubes having perforated partitions, containing a layer of glass granules moistened with a nondrying absorbent solution of sodium tetrachlor mercurate were field and laboratory tested for SO2 absorption efficiency. Large volume (up to 18 cum) air samples were passed through the tubes and SO2 concentrations measured in the absorbent and in a follower tube. Field tests were conducted at temperatures between -10 C and +15 C and in both dry and wet weather. Absorption efficiency is shown to be nearly 100% even for air volumes 10 times greater than necessary for measuring background concentrations. Other tests show that long term conservation of samples is possible either through refrigeration of storage in a CO2 atmosphere. Author (ESA)

N83-12656# Army Medical Bioengineering Research and Development Lab., Fort Detrick, Md.
ANAEROBIC DIGESTION OF LIME SLUDGE Technical Report, Mar. 1979 - May 1981
Edmund A. Kobylinski and Bruce A. Bell Jul. 1982 88 p refs
(DA Proj. 3E1-62720-A-835)
(AD-A118502; USAMBRDL-TR-8205) Avail: NTIS HC A05/MF A01 CSCL 13/2

The purpose of this project was to determine the feasibility of using anaerobic digestion to treat sludges from the low-level lime addition process for phosphorus removal. Because digester supernatant is normally recycled to the influent of the sewage treatment plant, the re-release of any phosphorus is important. The operating characteristics of the digester using the lime sludge for fuel must be determined for process control and design. Author (GRA)

N83-12657# Clarkson Coll. of Technology, Potsdam, N.Y. Dept. of Civil and Environmental Engineering.
EFFECTS OF ANAEROBIC CONDITIONS ON AVAILABILITY OF PARTICULATE PHOSPHORUS FROM TRIBUTARIES TO LAKE ERIE Final Report
John P. McAuliffe, Thomas C. Young, and Joseph V. DePinto Jun. 1982 82 p refs
(Contract DACW49-81-C-0045)
(AD-A118274) Avail: NTIS HC A05/MF A01 CSCL 06/6

In summary, the bioassay and fractionation data gathered in this study indicate that after tributary sediments are deposited, exposed to anaerobic conditions and resuspended, they will release no more phosphorus than if they had remained suspended. Author (GRA)

N83-12658# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Environmental Sciences Div.
EXCHANGE OF CARBON DIOXIDE BETWEEN A FOREST AND THE ATMOSPHERE
Charles E. Murphy, Jr. Jun. 1982 45 p refs
(Contract DE-AC09-76SR-00001)
(DE82-020061; DP-1630) Avail: NTIS HC A03/MF A01

The exchange of materials between the atmosphere and terrestrial ecosystems is important to an understanding of mineral cycling, the deposition of materials from the atmosphere, and the entrance of pollutants into the ecosystem. A theoretical basis for measurement of the flux density of gaseous material between the atmosphere and a forest is described. A measurement system for using this technique is described, and data taken with the system are presented. Analysis of the data indicates how environmental conditions affect transport of heat, water vapor, and carbon dioxide. DOE

N83-12659# Massachusetts Inst. of Tech., Cambridge.
SCALE EFFECTS IN LIQUEFIED FUEL VAPOR DISPERSION Final Technical Report
James A. Fay and Dale Ranck Dec. 1981 100 p refs
(Contract DE-AS02-77EV-04204)
(DE82-006198; DOE/EP-0032) Avail: NTIS HC A05/MF A01

Vapor clouds formed by rapid boiling of liquefied gas spilled on land or water exhibit unusual dispersive behavior caused by physical phenomena which are not yet adequately understood. To help elucidate these phenomena this study proposes a method for correlating observations made in disparate field and wind tunnel experiments and, using this methodology, compares all available test data. The bases of the method are a nondimensionalizing of the principle experimental observables and test parameters through use of atmospheric flow parameters and initial cloud properties and the use of a simple entrainment model to simplify the expected relationships among the observed quantities. Peak cloud concentration, travel time and distance are the observables used in this analysis. A good correlation was found in tests of isothermal clouds on level surfaces, but many tests are required to establish average cloud behavior. In tests on sloping ground, cloud drift time and distance were altered but the dilution rate was unaffected. DOE

N83-12660# Bendix Corp., Kansas City, Mo.
USE OF FREON FOR IN-PLACE FILTER TESTING
Norman P. Mast Feb. 1982 10 p Presented at the 28th Ann. Meeting of the Inst. of Environ. Sci., Atlanta, 20-23 Apr. 1982
(Contract DE-AC04-76DP-00613)
(DE82-008030; BDX-613-2740; CONF-820411-3) Avail: NTIS HC A02/MF A01

Test methods using freon as the challenge medium are described. It was found that Freon can provide an effective means for locating air leaks to infiltration into a clean air system by using equipment that is probably already available. To assure that quality parts are produced, the integrity of the clean room equipment must be maintained by using the right materials and trained

personnel. No one method or procedure can be applied to all the different types of operating conditions or products. DOE

N83-12661# California Univ., Berkeley. Lawrence Berkeley Lab.
BIOASSAY STUDIES TO DETERMINE OTECS EFFECT ON PHYTOPLANKTON ACTIVITY
C. J. W. Carmiggelt, E. O. Hartwig, M. L. Commins, and A. J. Horne Sep. 1982 36 p refs
(Contract W-7405-eng-48)
(DE82-021316; DOE/NBM-2021316) Avail: NTIS HC A03/MF A01

The effect of artificially upwelled water (800m) on phytoplankton from 25m and 100m was simulated by 5 day bioassays. It is shown that some enhancement of the phytoplankton populations in the receiving waters is likely to occur due to upwelling. The very small phytoplankton are most important in this response. The bioassays show that additions of ammonia produce biostimulation only when the P/N ratio indicates nitrogen limitation. In the Hawaiian waters sampled N-limitation was not always present and varied with depth. No nitrogen fixation was detected. The magnitude of stimulation due to ammonia alone was generally less than the addition of upwelled water which is a more complete nutrient mixture. DOE

N83-12662# World Meteorological Organization, Geneva (Switzerland).
REVIEW OF ATMOSPHERIC DIFFUSION MODELS FOR REGULATORY APPLICATIONS
S. R. Hanna 1982 52 p refs Sponsored by US Dept. of Energy, US Nuclear Regulatory Commission and NOAA
(WMO-581; ISBN-92-63-10581-9) Avail: NTIS MF A01; print copy available at WMO, Geneva, SwFr 9

The Gaussian plume model, most often used in western countries, and the gradient transport model, most often used in eastern countries, are considered and compared theoretically and empirically. Parameters predicted by the models are the magnitude and location of maximum ground level concentrations. It is shown that maximum concentrations predicted by the two models can differ by an order of magnitude, with the sign of the difference dependent on the specific application. However, on the average the models agree fairly well. The largest scientific difference is in the plume rise formulas, whereby the U.S. model predicts plume rises for typical industrial stacks that are twice as high as those predicted by the USSR model. Model applications to complex terrain, long-range transport and area sources are also covered. Research-grade models are used order to illustrate the type of model that can be expected to appear in regulatory procedures. These models are not presently in widespread use, either because they have not been adequately tested or because they require excessive computer time. Author (ESA)

N83-12663# World Meteorological Organization, Geneva (Switzerland).
TROPOSPHERIC CHEMISTRY AND AIR POLLUTION
H. Rodne, A. Eliassen, I. Isaken, F. B. Smith, and D. M. Whelpdale 1982 152 p refs
(WMO-583; WMO-TN-176; ISBN-92-63-10583-2) Avail: NTIS MF A01; print copy available at WMO, Geneva

The occurence, transformations, transport and removal of chemical compounds in the troposphere are reviewed. Compounds that are emitted in significant quantities by anthropogenic processes are emphasized. This is the class of reactive gases, e.g. SO2 and NOx, and aerosol particles with atmospheric residence times of days to weeks. Such compounds are transported over considerable distances (hundreds to thousands of kilometers) before they are deposited by precipitation or by direct uptake at the surface. The information is integrated in terms of mathematical modeling of transport, transformation, and removal as well as in terms of budgets, showing the magnitudes of the concentrations, fluxes and the turnover times. Author (ESA)

N83-12664# Public Technology, Inc., Washington, D. C.
BIOLOGICAL PROCESSES IN THE TREATMENT OF MUNICIPAL WATER SUPPLIES
R. G. Rice, C. M. Robson, G. W. Miller, J. C. Clark, and W. Kuhn Mar. 1982 442 p refs
(Contract EPA-R-804385)
(PB82-199704; EPA-600/2-82-020) Avail: NTIS HC A19/MF A01 CSCL 13B

The objective of this project was to study the use of Biologically Enhanced Granular Activated Carbon (BEGAC) technology in European water treatment plants and to determine its advantages and disadvantages for use in the United States. Seven European water works were visited in which chemical preoxidation followed by rapid media filration then GAC adsorption was being practiced and LEGAC process details were gathered. Author (GRA)

N83-12665# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
THE BEHAVIOR OF LNG VAPOR CLOUDS: WIND-TUNNEL SIMULATION OF 40 M3 LNG SPILL TESTS AT CHINA LAKE NAVAL WEAPONS CENTER, CALIFORNIA Final Report, Jul. 1979 - Jul. 1981
D. E. Neff and R. N. Meroney Jul. 1981 172 p refs
(PB82-199027; CER81-82DEN-RNM1; GRI-80/0094) Avail: NTIS HC A08/MF A01 CSCL 13B

Wind tunnel transient concentration data were obtained from modelling tests which reproduced gaseous dispersion from five different forty cubic meter or less liquefied natural gas (LNG) spills performed at China Lake Naval Weapons Center during the spring and summer of 1980. Comparisons in the transient concentration data between these modeled tests and the field tests indicated which parameters are dominant in the modelling process. Model tests which reproduced the wind shear and turbulence structure of the approach wind reproduced the concentration patterns measured at the field site. This result reinforced the predictive reliability of wind tunnel modeling of larger volume spills. GRA

N83-12666# Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
LNG PLUME INTERACTION WITH SURFACE OBSTACLES Final Report, Sep. 1980 - Sep. 1982
K. M. Kothari, R. N. Meroney, and D. E. Neff Sep. 1981 154 p refs
(Contract GRI-5014-352-0203)
(PB82-198995; GRI-80/0095; CER81-82KMK-RNM-DEN22) Avail: NTIS HC A08/MF A01 CSCL 13B

A wind-tunnel test program was conducted on a 1:250 scale model to determine the effects of surface obstacles on the dispersion of LNG and neutral density plumes. The tests were conducted with continuous LNG boiloff rate of 30 cu m/min, 4 and 7 m/sec wind speeds and 21 different sets of surface obstacle configurations. Plots of ground-level concentration (mean and peak) contours were constructed. The highest concentrations were observed without any surface obstacles. In general, the lower speed resulted in higher ground-level concentration when the surface obstacle interacted with the plume. The mean concentration measured with neutral density plume was about three to five times smaller in magnitude than those observed with the LNG plume. The measured concentration for LNG plumes tended to have its maximum off the centerline. The addition of smaller buildings gave only slight reduction in the LFL distances. The simulated tree line resulted in approximately the same concentration parallel to the tree line. Author (GRA)

N83-12667# Acurex Corp., Mountain View, Calif. Energy and Environmental Div.
NEASUREMENT OF HIGH-TEMPERATURE HIGH-PRESSURE PROCESSES: A SUMMARY REPORT Final Report, Sep. 1975 - Sep. 1979
L. Cooper and M. Shackleton Mar. 1982 135 p refs
(Contract EPA-68-02-2153)
(PB82-196932; EPA-600/7-82-009; ORD-79-353) Avail: NTIS HC A07/MF A01 CSCL 13B

An assessment and development of technology required to perform high-temperature high-pressure (HTHP) particulate sam-

pling is summarized. In addition to efforts devoted to developing and testing an HTHP sampler for the EPA/Exxon Miniplant, experience was gained in the design aspects of HTHP sampling equipment and testing procedures. This experience is highlighted. A background study and planning effort was directed toward possible future sampling efforts in a coal gasification plant. A state-of-the-art review of HTHP sampling was also performed. To document the materials collected, a bibliography of articles, reports, and books relating to HTHP sampling was compiled. A list of persons interested in this technology is also included. Results demonstrated that particle size distribution and samples suitable for chemical analysis can be obtained with the apparatus described in the report. Author (GRA)

N83-12668# Radian Corp., Durham, N.C.
MECHANISMS OF DRY SO2 CONTROL PROCESSES Final Report, Sep. 1980 - Sep. 1981
Cathy Apple and Mary E. Kelly Apr. 1982 137 p refs
(Contract EPA-68-02-3171)
(PB82-196924; EPA-600/7-82-026) Avail: NTIS HC A07/MF A01 CSCL 13B

Physical and chemical processes and reaction mechanisms for lime spray drying and dry injection of sodium compounds in dry flue gas desulfurization (FGD) processes are discussed. Chemical reactions, physical changes, proposed reaction mechanisms and mathematical models, process parameters affecting reactions and their rate, and data needed to verify proposed reaction mechanisms and models are includes. Published technical papers were the primary reference sources. Coal-fired boiler dry FGD applications are emphasized. Lime spray drying reactions are primarily gas/liquid-phase reactions, with SO2 removal depending on moisture in the lime slurry droplet. Initially, the moisture content is high, and the reaction rate is controlled by diffusion of SO2 to the droplet surface; most SO2 removal occurs during this phase. As evaporation reduces the moisture, the dissolution of Ca(OH)2 into ions limits the SO2 removal rate. Later, the precipitation of CaSO3+1/2 H2O onto the surface of the lime particles retards diffusion of SO2 to the unreacted sorbent. Injecting sodium compound powders into flue gas removes SO2 via gas/solid reactions. First, NaHCO3 is thermally decomposed to Na2CO3 (small pores in the sorbent particles increase the particles' surface area and reactivity). Then the SO2 reacts with Na2CO3 to form Na2SO3, starting at the particle surface.
Author (GRA)

N83-12669# Georgia Univ., Athens. Dept. of Mathematics.
PERSISTENCE IN MODEL ECOSYSTEMS Final Report, Sep. 1978 - Dec. 1980
Thomas C. Gard Apr. 1982 17 p refs
(Contract R-806161)
(PB82-196916; EPA-600/3-82-030) Avail: NTIS HC A02/MF A01 CSCL 13B

A hierarchy of microcosm-related models, the top level of which contains a nutrient-producer-grazer food chain, and general food chains are analyzed for persistence. The results, which take the form of inequalities involving model parameters, specify necessary conditions and sufficient conditions for continued presence of the model components throughout indefinite time intervals. These results can serve as a basis for preliminary evaluations of model performance. Author (GRA)

N83-12670# Cornell Univ., Ithaca, N. Y. College of Agriculture and Life Sciences.
AUTOHEATED, AEROBIC, THERMOPHILIC DIGESTION OF MUNICIPAL SLUDGE WITH AIR AERATION Final Report, Oct. 1976 - Oct. 1979
William J. Jewell, Randolph M. Kabrick, and James A. Spada Mar. 1982 366 p refs
(Contract R-804636)
(PB82-196908; EPA-600/2-82-023) Avail: NTIS HC A16/MF A01 CSCL 13B

A full-scale aerobic digestion system demonstrated that a simple self-aspirating aerator, that used ambient air, could achieve high oxygen transfer efficiencies and thereby allow conservation of heat. continuous feed operation utilizing primary and waste activated sludges resulted in autoheated reactor temperatures ranging from 45 to 65 C, even when ambient air temperatures were -20 C and sludge temperatures were O C. Process variables included organic loading rate and D.O. concentration. It was observed that intermediate loading rates and low D.O. residuals allowed maximum temperature development. The potential of the autoheated thermopilic digester to inactivate pathogens was investigated. Virus inactivation was 100%. Bacterial and parasite counts were less than those found in mesophilic anaerobic digestion sludge. Dewaterability of the aerobically treated sludge deteriorated at all loading conditions studied. This last feature was the only disadvantage evident in the process. Author (GRA)

N83-12671# Environmental Protection Agency, Washington, D.C. Office of Noise Abatement and Control.
NATIONAL AMBIENT NOISE SURVEY
Mark M. Hansen Jan. 1981 170 p
(PB82-193681) Avail: NTIS HC A08/MF A01 CSCL 13B

Outdoor noise environments in urban residential areas are surveyed. Overall noise levels, source contributions, and patterns of spatial and temporal variation in these areas, along with the effect of three locational factors on these parameters are determined. The survey employed a randomized, site selection procedure, a stratified sampling strategy, and a multifaceted measurement protocol. A simple model which predicts Ldn in these areas, projections of nationwide noise impact, average source contributions and temporal noise level histories and average variations in noise level at different locations around residential units were included in the results. S.L.

N83-12672# National Academy of Sciences - National Research Council, Washington, D. C. Committee on the Atmosphere and the Biosphere Board on Agriculture and Renewable Resources.
ATMOSPHERE-BIOSPHERE INTERACTIONS: TOWARD A BETTER UNDERSTANDING OF THE ECOLOGICAL CONSEQUENCES OF FOSSIL FUEL COMBUSTION Final Report, 15 Sep. 1978 - 31 Aug. 1981
1981 278 p refs
(PB82-182098) Avail: NTIS HC A13/MF A01 CSCL 06F

The pollutants sulfur and nitrogen compounds, trace metals, and organic substances were examined. It was noted that understanding of patterns of emission, transport, deposition, and biological effects of these pollutants is incomplete. Atmospheric transport and deposition processes and biological accumulation are described. A guide was developed to predict consequences of continued or accelerated pollution, and effects of acid rain were reported. It is concluded that increased scientific effort is needed in two critical areas: long term monitoring and forecasting of future effects of these pollutants, and ecotoxicology. GRA

N83-12673# Forest Service, Washington, D.C.
SMOKE MANAGEMENT: A WORKBOOK FOR BALANCING AIR QUALITY AND LAND MANAGEMENT GOALS Final Report
10 Jan. 1982 125 p refs
(PB82-188830; EPA-450/2-82-001) Avail: NTIS HC A06/MF A01 CSCL 13B

Balancing air quality and land management goals through smoke management is presented. The process can be applied wherever land management open burning has the potential to affect air quality, or wherever air quality restrictions may affect the use of fire as a land management practice. Confirmation of related public and technical issues, and developing issue resolving criteria are emphasized, leading to development and evaluation of alternatives. Two alternatives are emphasized: (1) increased utilization of residues in place of burning; and (2) scheduling of open burning to meet conditions specified for maintaining downwind concentrations of emissions to acceptable levels. Process supporting technical appendices cover development and evaluation of a smoke management program, predicting downwind concentrations, and determining visibility protection needs. GRA

N83-12674# Environmental Protection Agency, Corvallis, Oreg. Environmental Research Lab.
A REVIEW OF AQUATIC HABITAT ASSESSMENT METHODS Inhouse Report, Dec. 1979 - Dec. 1981
Gerald S. Schuytema Mar. 1982 41 p refs
(PB82-189648; EPA-600/3-82-003) Avail: NTIS HC A03/MF A01 CSCL 13B

Thirty aquatic habitat assessment techniques were summarized and compared to provide information to watershed and nonpoint pollution control managers. They are classified according to a number of mutually interacting categories such as impact assessment, inventory and general description, salmonid or nonsalmonid streams, particular fish species orientation, channel stability, transect, and biotic indices. Many of the methods have developed indices or numerical values which can be used for comparisons or evaluation. The development of habitat evaluation procedures (HEP) are techniques designed to assess project impacts oriented toward a particular species of interest are described. Parameters most frequently considered in the methods include: flow, temperature, water surface width, turbidity, gradient, velocity, depth, bank stability measures, bottom size distribution, siltation, cover, pool size, attached vegetation, fish and invertebrate types, riparian zone vegetation and shade, and obstructions such as waterfalls, dams, and culverts. It is concluded that the ultimate choice of method depends on geographical location, stream type, investigator expertise, and project goals. GRA

N83-12675# Iowa Dept. of Environmental Quality, Des Moines. Air and Land Quality Div.
IOWA AIR QUALITY REPORT, 1980
Jul. 1981 70 p refs
(PB82-189614) Avail: NTIS HC A04/MF A01 CSCL 13B

Air quality was monitored from 1957 to 1980. The following seven pollutants were monitored in Iowa: suspended particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, hydrocarbons, ozone and lead. The data are presented in tabular form for each pollutant. The pollutants and pollutant sources, the air monitoring network, and the analysis of data and trends are also discussed. GRA

N83-12741# World Meteorological Organization, Geneva (Switzerland).
SUMMARY OF THE CLIMATOLOGICAL DATA SITUATION IN AFRICA
E. G. Davy *In its* Tech. Conf. on Climate: Africa 1982 p 171-187
(For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-12676# Commonwealth Scientific and Industrial Research Organization, Melbourne (Australia). Div. of Atmospheric Physics.
DESCRIPTION OF A ONE DIMENSIONAL GLOBAL CARBON CYCLE MODEL
I. G. Enting and G. I. Pearman 1982 100 p refs
(CSIRO-Technical-Paper-42; ISBN-0-643-03015-8) Copyright. Avail: Issuing Activity

A one-dimensional carbon cycle model is described. The model validation, parameter estimation and sensitivity are discussed and potential applications are outlined. R.J.F.

N83-12677# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE DISSIPATION OF A SODIUM CLOUD
Volker W. J. H. Kirchhoff and Barclay R. Clemesha Jul. 1982 15 p refs Submitted for publication
(INPE-2492-PRE/175) Avail: NTIS HC A02/MF A01

Occasional observations of strong increases in the atmospheric sodium densities and/or Na nightglow intensities suggest that the cause is the deposition of a sodium cloud in addition to the local equilibrium sodium layer. This situation is simulated to investigate the response of the atmospheric sodium layer to variations of the source influx rate. The settlement of the sodium to the equilibrium layer after the deposition of a sodium cloud is shown to be a long lived event in which the excess sodium is transported downwards, to the sink, by eddy diffusion. The possibility of a modulated source influx rate is also investigated showing a tendency for a strong attenuation of this modulation below the source. Author

N83-12678# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ON THE POSSIBILITY OF BAROTROPIC INSTABILITY OVER NORTHEAST BRAZIL
Vadlamudi Brahmananda Rao, Valdo daSilva Marques, and Jose Paulo Bonatti Sep. 1982 23 p refs Submitted for publication
(INPE-2531-PRE/198) Avail: NTIS HC A02/MF A01

The easterly zonal wind profile over Northeast Brazil during the rainy season of a heavy rainfall year satisfies the necessary condition for the existence of barotropic instability. The scale of maximum growth rate is compatible with the estimated scale of the observed disturbances. The zonal wind profile is found to be stable during a dry year. This suggests the important role of barotropic instability phenomenon in the interannual variations of rainfall over Northeast Brazil. Author

N83-12679# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ON PARTICLE IONIZATION RATES IN THE LOWER IONOSPHERE OVER THE SOUTH ATLANTIC MAGNETIC ANOMALY
M. A. Abdu, J. H. A. Sobral, and I. S. Batista Aug. 1982 10 p refs Submitted for publication
(INPE-2497-PRE/180) Avail: NTIS HC A02/MF A01

The possible magnitude of ion production rates in the lower ionosphere over the south Atlantic magnetic anomaly, arising from precipitation of energetic electrons, is assessed. Author

N83-12680# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EDDY DIFFUSION COEFFICIENTS IN THE LOWER THERMOSPHERE
V. W. J. H. Kirchhoff and B. R. Clemesha Aug. 1982 18 p refs Submitted for publication
(INPE-2502-PRE/183) Avail: NTIS HC A02/MF A01

The seasonal variation of the eddy diffusion coefficient is deduced for a height of 94 km at 23 deg S based on two independent methods of analysis. One is related to indirect measurements of atomic oxygen and the other to measurements of the density of upper atmospheric sodium. The results are mutually consistent giving a maximum eddy diffusion coefficient during summer. Author

N83-12681# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN INTERACTIVE MODEL FOR ATMOSPHERIC CORRECTION IN SATELLITE IMAGES
Luiz Alberto Vieira Dias, Nandamudi Lankalapalli Vijaykumar, and Antonio Eduardo Costa Pereira Aug. 1982 11 p refs Presented at the 16th Intern. Symp. on Remote Sensing of Environ., Buenos Aires, 2-9 Jun. 1982
(INPE-2500-PRE/182) Avail: NTIS HC A02/MF A01

A procedure to test quantitatively the performance of an atmospheric correction algorithm is described. It is difficult to obtain a reasonable atmospheric model for Brazilian conditions, due to lack of aerosol data. The procedure consists of correcting two images of the desired scene, for different days, changing the aerosol optical depth, and images. For a better correction, the contrast and the correlation between the correlation. Based on

the previous information, it is possible to select the proper aerosol optical depth. Care should be taken, however, since an exaggerated contrast improvement by itself or a good correlation alone are not sufficient. Using both criteria, a better judgement can be made. Scenes that have undergone considerable temporal changes, as those at different stages of a given crop, should be avoided. In order to make the interactive model practical, it was necessary to calculate quickly and interactively the atmospheric transmittance. This was done by means of a modified LOWTRAN program. The modifications were introduced in order to make LOWTRAN more user-friendly, by allowing direct user interaction vis video terminals, including graphic of the input model and the output profiles. Author

N83-12682*# Institute for Atmosphere Optics and Remote Sensing, Hampton, Va.

ATMOSPHERIC BACKSCATTER MODEL DEVELOPMENT FOR CO SUB 2 WAVELENGTHS Final Contractor Report

Adarsh Deepak, Geoffrey Kent, and Glenn K. Yue Washington NASA Oct. 1982 97 p refs

(NASA-CR-3638; NAS 1.26:3638; IFAORS-189) Avail: NTIS HC A05/MF A01 CSCL 04A

The results of investigations into the problems of modeling atmospheric backscatter from aerosols, in the lowest 20 km of the atmosphere, at CO2 wavelengths are presented, along with a summary of the relevant aerosol characteristics and their variability, and a discussion of the measurement techniques and errors involved. The different methods of calculating the aerosol backscattering function, both from measured aerosol characteristics and from optical measurements made at other wavelengths, are discussed in detail, and limits are placed on the accuracy of these methods. The effects of changing atmospheric humidity and temperature on the backscatter are analyzed and related to the actual atmosphere. Finally, the results of modeling CO2 backscatter in the atmosphere are presented and the variation with height and geographic location discussed, and limits placed on the magnitude of the backscattering function. Conclusions regarding modeling techniques and modeled atmospheric backscatter values are presented in tabular form. Author

N83-12683# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

BAROCLINIC ANALYSIS OF THE SOUTHERN HEMISPHERE [UMA ANALISE DA BAROCLINIA DA ATMOSFERA DO HEMISFERO SUL]

Prakki Satyamurti and Vadlamudi Brahmananda Rao Sep. 1982 20 p refs In PORTUGUESE; ENGLISH summary Presented at 20th Congr. Brasileiro de Meterolog., Pelotas, Brazil

(INPE-2541-PRE/203) Avail: NTIS HC A03/MF A01

The observed meridional temperature gradients in the middle and high latitudes of the Southern Hemisphere are much higher than the critical gradients necessary for the manifestation of the baroclinic instability in a two layer quasi-geostrophic model. This result contradicts the so called 'baroclinic adjustment' observed in the Northern Hemisphere. However, an analysis of the baroclinic instability of the mean zonal winds in the Southern Hemisphere reproduced various aspects of the observed cyclogenesis. S.L.

N83-12684# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

POSSIBILITY OF DETECTING THE NUCLEAR GAMMA LINE AT 6.13 MeV OF ATMOSPHERIC AND COSMIC ORIGIN O(16) [POSSIBILIDADE DE DETECCAO DA LINHA GAMA NUCLEAR EM 6.13 MeV DO O(16) DE ORIGEM ATMOSFERICA E COSMICA]

J. O. D. Jardim, J. M. daCosta, I. M. Martin, D. Boclet, Ph. Durouchoux, M. V. A. Jardim, and T. Villela Neto Aug. 1982 11 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Prepared in cooperation with Commissariat a l'Energie Atomique, Saclay, France

(INPE-2511-PRE/190) Avail: NTIS HC A02/MF A01

Using the parameters of two Ge(Li) diodes of 76 and 140 cu cm of effective volume ready to be launched in a balloon-borne telescope, the minimum observing time at float is determined in order to detect the atmospheric flux of the line at 6.13 MeV with statistical significance greater than 3 sigma. N.W.

N83-12685# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

DAILY GEOMAGNETIC LUNAR TIDE IN THE REGION NEAR VASSOURAS (23 DEG 24 MINUTES SOUTH; 43 DEG 39 MINUTES WEST [MARE LUNAR GEOMAGNETICA DIARIA NA REGIAO DE VASSOURAS (22 DEG S; 43 DEG W)]

J. O. D. Jardim, C. M. E. Santo, and N. B. Trivedi Aug. 1982 10 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Sponsored in part by Fundo Nacional de Desenvolvimento Cientifico e Technologico and FINEP

(INPE-2503-PRE/184) Avail: NTIS HC A02/MF A01

Using the data for the horizontal component of the geomagnetic field the amplitudes and phases for the first four harmonics in the Chapman phase law for the lunar daily variations were calculated using the Chapman-Miller method. A modified FORTRAN program was used to analyze the data. The main lunar component with a half day period, was calculated as being of about 0.7 gamma and its probable vector error is of the order of 0.2 gamma. The analysis rejects days for which the geomagnetic index is greater than 20. Author

N83-12686# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

Ge(Li) TELESCOPE FOR OBSERVING ATMOSPHERIC GAMMA RAY LINES IN THE SOUTHERN HEMISPHERE [TELESCOPIO Ge(Li) PARA OBSERVACAO DE LINHAS DE RAIOS GAMA NA ATMOSFERA DO HEMISFERIO SUL]

J. M. daCosta, J. O. D. Jardim, I. M. Martin, D. Boclet, Ph. Durouchoux, E. Olivier, R. Senador, A. Malutae, and T. Villela Neto Aug. 1982 22 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Sponsored by FNDCT and FINEP

(INPE-2513-PRE/192) Avail: NTIS HC A02/MF A01

An omnidirectional gamma-ray telescope with a high energy resolution was constructed for balloon nuclear astronomy. This telescope counts, essentially, on a gamma-ray spectrometer which is formed by a 76 cu cm Ge(Li) detector, with a resolution of 4.48 KeV at 1.33 MeV (60) Co and 11.4 KeV at 6.13 MeV (Pu-C), surrounded by an active shield (anticoincidence) of plastic scintillators 1.8 cm thick. The Ge(Li) detector is mounted inside a cryostat cooled by liquid nitrogen. Two 2048 channel encoders are calibrated to measure gamma-rays in the energy intervals of 25 KeV-4.5 MeV and 96 KeV-7.4 MeV, assuring channel windows less than 4 KeV/channel. Monoenergetic gamma-rays emitted by (22) Na, (137) Cs, (133) Ba, (152) Eu, (241) Am, Am-Be, Pu-C sources and electrons from beta decays of (90) Sr-(90) Y and (137) Cs conversion electrons were used to calibrate the spectrometer. A telescope sensitivity of < or = .003 photons cm (-2) S (-1) was estimated with a 3-sigma confidence level, for the detection of the oxygen line at 6.129 MeV, during a 3-hour observation at 3.5 mb, in the atmosphere of the Southern Hemisphere, at 12 GV. Author

N83-12687# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

APPLICATION OF A RADIATIONAL BOUNDARY CONDITION TO A BAROCLINIC MODEL [APLICACAO DA CONDICAO DE RADIACAO EM UM MODELO BAROCLINICO]

Claudio Solano Pereira, Pedro Leite daSilva Dias, and Mary Toshie Kagano Oct. 1982 32 p refs In PORTUGUESE; ENGLISH summary Presented at 2nd Congr. Brasileiro Meteorol., Pelotas, Brazil, 1982

(INPE-2550-PRE/206) Avail: NTIS HC A03/MF A01

The lateral boundary condition of bounded numeric models of the atmosphere air relevant as far as energy propagation is concerned. In paticular the ideal boundary condition should not distort the geostrophic adjustment process. This report concerns a detailed description of the numerical aspects of the radiational boundary condition applied to a two dimensional (x,p) finite difference model. The radiational boundary condition consists in

applying the advection equation to all prognostic variables. The advective speed corresponds to the group velocity of the most representative vertical modes (external and internal). Numerical test is performed by assuming a horizontal speed perturbation and comparing two types of lateral boundary conditions: rigid boundary and radiational boundary condition. The validity of the radiational boundary condition is tested by comparing the results with the rigid boundary displaced away from the inner domain, where the initial condition is given. Author

N83-12688# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
COMPARISON OF IONOSPHERIC ELECTRON DENSITY PROFILES OBTAINED WITH THE INTERNATIONAL REFERENCE IONOSPHERE (IRI) 79 MODEL AND OBSERVED AT CACHOEIRA PAULISTA [COMPARACAO ENTRE PERFIS DE DENSIDADE ELETRO NICA DA IONSFERA, OBTIDOS PELO MODELO IRI 79 E OBSERVADOS EM CACHOEIRA PAULISTA]
Eurico R. dePaula, Antonio C. R. deSouza, I. J. Kantor, and Severino L. G. Dutra Sep. 1982 19 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Sponsored by Fundo Nacional de Desenvolvimento Cientifico e Technologico and FINEP
(INPE-2540-PRE/202) Avail: NTIS HC A02/MF A01

An ionospheric computer model IRI 79 (International Reference Ionosphere) was implemented. With a computer program developed for the determination of of the the ionospheric profile N(h), using ionograms a comparative study between the observed and predicted profiles was made. A very good agreement was not observed between them, specially for night-time observations, partly because the IRI model represents global tendencies of ionospheric behavior. The consequences of the use of IRI model for propagation studies are analyzed. Author

N83-12689# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
LATITUDINAL VARIATION OF TELLURIC AND ATMOSPHERIC GAMMA-RAY RADIATION [VARIACOES DA RADICAO NATURAL DE FOTONS GAMA EM FUNCAO DA LATITUDE]
I. M. Martin and N. A. Buivan (Toulouse Univ.) Sep. 1982 9 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Sponsored in part by Fundo Nacioal de Desenvolvimento Cientifico e Technologico and FINEP
(INPE-2538-PRE/201) Avail: NTIS HC A02/MF A01

The latitudinal variation of the telluric gamma radiation in the energy range 0.3 to 5.0 MeV was measured and compared with that produced at terrestrial atmospheric stratospheric balloon heights (40 Km). The similarity of measured spectra at the ground level and in the atmosphere is also discussed. Author

N83-12690# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRICAL FIELDS AT STRATOSPHERIC BALLOON ALTITUDES Ph.D. Thesis [CAMPOS ELETRICOS EM ALTURAS DE BALAO ESTRATOSFERICO]
S. L. G. Dutra Oct. 1982 201 p refs In PORTUGUESE; ENGLISH summary
(INPE-2556-TDL/103) Avail: NTIS HC A10/MF A01

Equatorial and low latitude quasi-static atmospheric electric fields is presented were investigated. Measurements with detectors on board stratospheric balloons are discussed and numerical algorithms for a related simulation are developed, providing original information on electrodynamic processes that seem to occur in these regions. The measurements show unexpectedly large horizontal fields of the order of 10 mV/m, and in the simulation they are associated to nergetic particle precipitation events in the South Atlantic magnetic anomaly region that seem to be enhanced during magnetically active periods. Author

N83-12691# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SPECTRAL PROPERTIES OF MINERALS AND ROCKS AND THEIR APPLICATIONS IN GEOLOGY [PROPRIEDADES ESPECTRAIS DE MINERAIS E DE ROCHAS E SUAS APLICAOES EM GELOLOGIA]
Milton Garcia Balleiro Aug. 1982 124 p refs In PORTUGUESE; ENGLISH summary
(INPE-2515-NTE/192) Avail: NTIS HC A06/MF A01

This study compiles various considerations about the process of interaction between electromagnetic radiation and material of the Earth's crust. The espectral properties of rocks and minerals are described and the application of this information to geological study is discussed. Author

N83-12692# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MATHEMATICAL INVERSION METHODS USED FOR THE INFERENCE OF VERTICAL PROFILES OF ATMOSPHERIC TEMPERATURE USING REMOTE SOUNDING BY SATELLITE [METODOS MATEMATICOS DE INVERSAO UTILIZADOS PARA A INFERENCIA DE PERFIS VERTICAIS DE TEMPERATURA ATMOSFERICA A PARTIR DE SONDAGENS REMOTAS POR SATELITE]
Marlene Elias Oct. 1982 135 p refs In PORTUGUESE; ENGLISH summary
(INPE-2549-RPE/422) Avail: NTIS HC A07/MF A01

Mathematical inversion methods used to infer atmospheric thermal structure from infrared satellite data are compared. Linear and nonlinear methods are considered. The difficulty of producing temperature profiles when discontinuities are prominent in the tropopause and near the surface of the Earth is discussed. J.D.

N83-12693*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE REPORT OF THE GRAVITY FIELD WORKSHOP
David E. Smith Apr. 1982 17 p refs Workshop held at Greenbelt, Md., 24-26 Feb. 1982
(NASA-TM-84003; NAS 1.15:84003) Avail: NTIS HC A02/MF A01 CSCL 08N

A Gravity Field Workshop was convened to review the actions which could be taken prior to a GRAVSAT mission to improve the Earth's gravity field model. This review focused on the potential improvements in the Earth's gravity field which could be obtained using the current satellite and surface gravity data base. In particular, actions to improve the quality of the gravity field determination through refined measurement corrections, selected data augmentation and a more accurate reprocessing of the data were considered. In addition, recommendations were formulated which define actions which NASA should take to develop the necessary theoretical and computation techniques for gravity model determination and to use these approaches to improve the accuracy of the Earth's gravity model. Author

N83-12694# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DATA ON THE ATMOSPHERIC SURFACE BOUNDARY LAYER OVER A CULTIVATED FIELD [DADOS DA CAMADA LIMITE SSUPERFICIAL DA ATMOSFERA PARA UM CAMPO CULTIVADO]
Romisio G. B. Andre, Yelisettty Viswanadham, and Alpheu de Almeida Sep. 1982 103 p refs In PORTUGUESE; ENGLISH summary
(INPE-2522-RPE/414) Avail: NTIS HC A06/MF A01

A micrometeorological field program was conducted over a cultivated field in an agricultural experimental station. The radiation components, soil heat flux, the profiles of wind, temperature and humidity, and other meteorological parameters in the atmospheric surface boundary layer were studied. The profiles and various meteorological data are presented. S.L.

N83-12695# Naval Research Lab., Washington, D. C. Plasma Physics Div.
ON THE PROSPECTS FOR ARTIFICIALLY INDUCING EQUATORIAL SPREAD F Interim Report
S. T. Zalesak and S. I. Ossakow 9 Sep. 1982 30 p refs
(AD-A118844; NRL-MR-4899) Avail: NTIS HC A03/MF A01 CSCL 12/1

The possibility of artificially inducing the onset of equatorial spread F by the collision dominated Rayleigh-Taylor or ExB gradient drift instability mechanism via a hypothetical chemical release in the equatorial ionosphere is considered. Each of the factors affecting the outcome of such an experiment is examined, and recommendations are made with the goal of maximizing the chances of successfully triggering the instabilities. Author (GRA)

N83-12696# Kansas Univ., Lawrence. Dept. of Chemistry.
LABORATORY STUDIES OF SOLVATED GAS-PHASE ANIONS Final Scientific Report, 1 Mar. 1981 - 28 Feb. 1982
Peter M. Hierl Feb. 1982 9 p refs
(Grant AF-AFOSR-0105-81; AF Proj. 2303)
(AD-A118578; AFOSR-82-0660TR) Avail: NTIS HC A02/MF A01 CSCL 04/1

Cross sections are reported for the reactions of the solvated anions OH-(H2O) with CO2 and SO2 over the range of reactant translational energy 0.n15-25.0 eV (LAB). Reactions observed include solvent switching, collisional dissociation, and charge transfer. These reactions are particularly important to the ion chemistry of the Earth's atmosphere below 80 km, where considerable hydration of negative ions has been observed. Author (GRA)

N83-12697# Systems Science and Software, La Jolla, Calif.
A MODEL FOR TECTONIC STRAIN RELEASE FROM EXPLOSIONS IN COMPLEX PRESTRESS FIELDS APPLIED TO ANOMALOUS SEISMIC WAVES FROM NTS AND EASTERN KAZAKH EXPLOSIONS
J. L. Stevens Jan. 1982 82 p refs
(Contract F08606-79-C-008; ARPA Order 2551)
(AD-A118503; SSS-R-82-5358; VSC-TR-82-20) Avail: NTIS HC A05/MF A01 CSCL 08/11

Anomalous surface waves including Love waves and phase reversed Rayleigh waves have been observed from explosions at NTS and from the eastern Kazakh areas of the Soviet Union. In this report we use a linear model for tectonic strain release to estimate the amount and type of prestress required to produce these anomalies. An important use of these results is to guide the input to fully nonlinear simulations of an explosion detonated in a prestressed environment. GRA

N83-12698# Great Lakes Archaeological Research Center, Inc., Waukesha, Wisc.
PRELIMINARY INVESTIGATIONS: ARCHAEOLOGY AND SEDIMENT GEOMORPHOLOGY, NAVIGATION POOL 12, UPPER MISSISSIPPI RIVER. VOLUME 2. TECHNICAL DOCUMENTS AND SITE DATA SHEETS
1981 143 p refs 2 Vol.
(Contract DACW25-81-C-0045)
(AD-A118798; Rept-115) Avail: NTIS HC A07/MF A01 CSCL 05/6

The purpose of this contract is to obtain a cultural resources survey and report for Pool 12 of the Mississippi River. The work will be a 100 percent cultural resource inventory of selected areas in Pool 12 in compliance with Executive Order 11593 and Public Law 93-291. The objective is to generate a qualitative predictive model for site locations and to evaluate the effects of erosion from maintenance of the pool on the cultural resources within the pool. Author (GRA)

N83-12699# Air Force Geophysics Lab., Hanscom AFB, Mass. Aeronomy Div.
SONDE EXPERIMENTS FOR COMPARATIVE MEASUREMENTS OF OPTICAL TURBULENCE Interim Scientific Report
J. H. Brown, R. E. Good, P. M. Bench, and G. Faucher 24 Feb. 1982 49 p refs
(AF Proj. 6687)
(AD-A118740; AFGL-TR-82-0079; AFGL-IP-310) Avail: NTIS HC A03/MF A01 CSCL 04/2

Five different instruments were used in multiple experiments to measure atmospheric turbulence in the form of the refractive structure constant, C sub n squared. These included UHF radar, optical scintillometer, modified radiosondes, AFGL thermosondes, and aircraft micro-thermal measurements. Described here are the radiosonde and thermosonde electronics and their calibrations. The data reduction scheme is described and a brief program description is given. Although the different instruments gave measurements somewhat separated in space and time, first results show good agreement between the radar, scintillometer, and thermosonde measurements. Author (GRA)

N83-12700# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Sciences Div.
THE STATISTICAL RELATIONS AMONG Q, Kp, AND THE GLOBAL WEATHER CENTRAL -K INDICES Interim Scientific Div.
B. S. Dandekar 13 Jan. 1982 32 p refs
(AF Proj. 414L)
(AD-A118734; AFGL-TR-82-0010; AFGL-ERP-763) Avail: NTIS HC A03/MF A01 CSCL 08/14

The K index determined by the Air Force Global Weather Central has been compared with Kp and Q (from Sodankyla) for the period March 1978 - May 1981 to determine empirical relations between Kp vs K, Q vs Kp, and Q vs K. The study shows that the K index is a reasonably good measure of Kp during most of the time. The time-dependent relations between Q and K, and Kp and K are derived, so that one can convert the K (AFGWC) index to the Kp or Q index for specification of the auroral ionosphere in the Experimental Radar System test region. GRA

N83-12701# Boston Coll., Chestnut Hill, Mass. Dept. of Physics.
ATMOSPHERIC DENSITY MODELS, INCLUDING TIDES Final Report, 28 Mar. 1979 - 28 Mar. 1982
Jeffrey M. Forbes 31 Mar. 1982 17 p
(Contract F19628-79-C-0088; AF Proj. 6690)
(AD-A118723; AFGL-TR-82-0119) Avail: NTIS HC A02/MF A01 CSCL 04/1

A numerical model has been developed to solve the linearized atmospheric tidal equations for diurnal and semidiurnal temperatures and the 3 velocity components of the wind field from the surface to the upper thermosphere (Ca. 400km). Density, pressure, and composition variations can be computed from a simple auxiliary set of equations. Extensive tables and figures have been compiled for potential users. Validity of the model has been verified by comparison with various rocket and satellite data. GRA

N83-12702*# National Aeronautics and Space Administration, Washington, D. C.
THE NASA GEODYNAMICS PROGRAM REPORT, 1981 Annual Report, 1981
Aug. 1982 59 p refs
(NASA-TM-85126; EL-4; NAS 1.15:85126) Avail: NTIS HC A04/MF A01 CSCL 08G

The activities of the NASA Geodynamics Program in 1981 both in achieving improved measurement precision and in establishing the foundation for the acquisition and analysis of scientific data are discussed. R.J.F.

N83-12703# Law Engineering Testing Co., Atlanta, Ga.
GEOLOGICAL EVALUATION OF GULF COAST SALT DOMES: OVERALL ASSESSMENT OF THE GULF INTERIOR REGION
Oct. 1982 165 p refs
(Contract DE-AC06-76RL-01830)
(DE82-015755; ONWI-106) Avail: NTIS HC A08/MF A01

Regional geologic aspects of the Gulf Coast salt dome basins were identified. Included are: general information from published sources on the regional geology; the tectonic, domal, and hydrologic stability; and a brief description the salt domes to be investigated. Eight domes were chosen for further characterization. A general description of each dome maps of the location, property ownership, and surface geology, and a geologic cross section are presented. DOE

N83-12704# Texas Univ., Austin. Electrical Geophysics Research Lab.

A MULTI-SITE MAGNETOTELLURIC MEASUREMENT SYSTEM WITH REAL-TIME DATA ANALYSIS Final Technical Report
J. D. Becker, F. X. Bostick, and H. W. Smith Sep. 1981 189 p refs
(Contract DE-AS05-77ET-28341)
(DE82-020596; DOE/ET-28341/T1) Avail: NTIS HC A09/MF A01

A magnetotelluric measurement system was designed to provide a more cost effective electrical method for geothermal and mineral exploration. The theoretical requirements and sensitivities of the magnetotelluric inversion process were specifically addressed in determining system performance requirements. Remotely located, battery powered, instrumentation packages return data to a central controlling site through a 2560 baud wire-line or radio link. Each remote package contains preamplifiers, data conditioning filters, and a 12 bit gain ranging A-D converter for frequencies from 0.001 Hz to 8 Hz. Data frequencies above 8 Hz are processed sequentially by a heterodyne receiver to reduce bandwidth to within the limits of the 2560 baud data link. The central data collection site provides overall control for the entire system. Data from the remote packages may be recorded in time sequence on a magnetic tape cartridge system, or an optional Hewlett-Packard 21MX minicomputer can be used to perform real time frequency analysis. The results of this analysis provide feedback to the operator for improved evaluation of system performance and for selection of future measurement sites. GRA

N83-12705# Sandia Labs., Albuquerque, N. Mex. Geotechnical Products Div.
PRELIMINARY DESIGN AND DEFINITION OF FIELD EXPERIMENTS FOR WELDED TUFF ROCK MECHANICS PROGRAM
Roger M. Zimmerman Jun. 1982 38 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018916; SAND-81-1972) Avail: NTIS HC A03/MF A01

G-tunnel on the Nevada Test Site intersects the Grouse Canyon Member, Belted Range Tuff, that has similar thermal and mechanical properties to welded tuff strata in nearby Yucca Mountain, which is considered as a site for a nuclear waste repository. A rock mechanics testing program is developed. Field data used for site characterization and repository conceptual design is investigated. This preliminary design is prepared to provide a control document for definition, implementation, operation, and evaluation activities for five rock mechanics experiments that can be placed in this geologic unit. DOE

N83-12706# Oak Ridge Associated Universities, Inc., Washington, D.C. Inst. for Energy Analysis.
GEOTHERMAL-RESOURCE SURVEY OF THE TENNESSEE VALLEY REGION
W. P. Staub and N. L. Treat Aug. 1982 133 p refs
(Contract DE-AC05-76OR-00033)
(DE82-021951; ORAU/IEA-82-7(M)) Avail: NTIS HC A07/MF A01

An overview appraisal of the geothermal resources in the Tennessee Valley Region revealed geothermal resources of potential usefulness in two of 13 subregions: the New Madrid Seismic Zone and the central segment of the Northern Gulf Coastal Plain. The appraisal was based on geologic features of the region (hot springs, groundwater aquifers, and structure) and temperature data for oil and gas wells and shallow water wells. Site specific exploration for economic appraisal was not carried out. The geothermal gradient for each of the subregions was established by linear regression of all of the bottom hole temperature data for the oil and gas wells. A routine statistical procedure identified all unusually warm wells within each subregion, and their locations were plotted. Hot spots in a subregion were identified by localized clustering of such wells in numbers exceeding statistical expectations based on the intensity of drilling activity. Of the two areas most likely for extraction of geothermal energy, the New Madrid Seismic Zone has a high geothermal gradient at shallow depths (less than 500 meters). DOE

N83-12707# World Meteorological Organization, Geneva (Switzerland).
REPORT OF THE MONEX REVIEW MEETING Global Atmospheric Research Programme
1981 146 p refs Conf. held at Denpasar, Bali, 2-6 Nov. 1981
Prepared on cooperation with ICSU, Rome
(GARP-Spec-Rept-38) Avail: NTIS MF A01; print copy available at WMO, Geneva

Completion of Monex data management was planned and further monsoon investigations were proposed. Summer Monex data collection is summarized. The status of level 2 b data and nonmerged, non-FGGE data processing is reported. Winter Monex data management is surveyed. Upper air dropwindsonde and ship data for oceanic areas in the summer Monex region are given. Statistics of synoptic data from quick look tapes, stripped FGGE tapes, level 2 b tapes and ship observations during 1 - 7 May 1979 are available. Author (ESA)

N83-12708# Texas Univ., Austin. Bureau of Economic Geology.
GEOLOGIC STUDIES OF GEOPRESSURED AND HYDROPRESSURED ZONES IN TEXAS: SUPPLEMENTARY TASKS Final Report
B. R. Weise, L. A. Jirik, H. S. Hamlin, S. L. Hallam, M. B. Edwards, R. A. Schatzinger, N. Tyler, and R. A. Morton Mar. 1982 134 p
(Contract GRI-5011-321-0125)
(PB82-200619; GRI-80/0109) Avail: NTIS HC A07/MF A01 CSCL 08G

The potential for producing solution gas from shallow geopressured and deep hydropressured aquifers was assessed for the Frio, Vicksburg, and Wilcox sandstone trends of the Texas Gulf Coast. Geological and engineering studies of prospect areas show that below the top of geopressure, sandstones are generally thinner, permeabilities are lower, and fault density is greater, but there is no appreciable difference in these parameters between the shallow and deep geopressured sediments. Extant test data indicate that some geopressured aquifers produce free gas in addition to solution gas. Consequently hydrocarbon-to-water ratios in both shallow and deep aquifers are comparable and less than 40 SCF/bbl. Of the five prospect areas studied, none is recommended for solution gas tests, and only one, Port Arthur Field, warrants further investigation as a candidate for coproduction of solution gas as well as dispersed free gas. This field has multiple watered-out gas sands with good reservoir characteristics and high abandonment pressures. Many other fields were initially rejected as dispersed gas candidates because of active gas production. Author (GRA)

N83-12709# Bureau of Mines, Denver, Colo.
ROCK MECHANICS INVESTIGATION OF TWO BED TRONA MINING, GREEN RIVER, WYOMING
R. O. Kneisley Jan. 1982 29 p refs
(PB82-177312; BM-RI-8598) Avail: NTIS HC A03/MF A01 CSCL 08I

Rock mechanics measurements indicate that the present two bed mine design used at the Big Island trona mine, Green River, Wyo., results in stable workings. Vertical pressure changes in the lower panel pillars and horizontal pressure changes in the lower bed roof and floor indicated negligible upper bed mining influence. Pillar stresses stabilized soon after upper bed mining was completed. Strata movements in the pillar ribs, roof, and floor were also negligible and stabilized soon after completion of upper bed mining. Using tributary area theory, the confined core approach, and studies of model trona pillars it is shown that increased extraction ratio is possible. A program of gradually increased extraction ratio accompanied by simple measurements should result in a mine design that includes both higher recovery and long term stability. GRA

N83-12710# National Weather Service, Anchorage, Alaska. Forecast Office.
SEA ICE CONDITIONS IN COOK INLET, ALASKA DURING THE 1979 - 1980 WINTER

Francis W. Poole May 1981 16 p refs
(PB82-180259; NOAA-82022502; NOAA-TM-NWS-AR-32) Avail: NTIS HC A02/MF A01 CSCL 08K

A warm fall and spring which brought a late onset (December 12) and an early departure (March 26) of significant ice is examined. This was the shortest ice season since records began in 1969. Ice coverage was extensive and reached its maximum by January 28 with nearly all Cook Inlet covered north of Anchor Point and Cape Douglas. Ice coverage changed little from late January through mid March. Periods of warming and cooling caused changes in the ice concentrations and hardness. During an episode of strong north winds over the lower inlet on February 3, ice flowed past Cape Douglas into Shelikof Strait which included stamukhi more than a meter thick; this ice disintegrated by February 8. A period of rapid warming began on March 20 and the inlet was free of significant ice by March 26. GRA

N83-12711# National Academy of Sciences - National Research Council, Washington, D. C. Ad Hoc Committee on the Upper Atmosphere and Near-Earth Space.
STUDY OF THE UPPER ATMOSPHERE AND NEAR-EARTH SPACE IN POLAR REGIONS: SCIENTIFIC STATUS AND RECOMMENDATIONS FOR FUTURE DIRECTIONS
1982 54 p
(PB82-198771) Avail: NTIS HC A04/MF A01 CSCL 03B

The upper atmosphere and near Earth space were studied. Statements and recommendations relevant to research in the polar regions, the ones specifically addressed to polar science, and policy issues that are important for the furthering of basic and applied studies of the polar upper atmosphere and near Earth space during the coming years are reviewed. Directions for research in three broad areas are recommended: (1) space plasmas; (2) neutral atmosphere physics; and (3) research relevant to applied fields and other disciplines including ionispheric inhomogeneities, electromagnetic and particle radiation background at high latitudes, geomagnetic influences on ground based systems, and astronomical and solar research. The establishment of a mechanism for coordinaing polar programs in upper atmosphere and near Earth space research be established are recommended.DOE

N83-12712# Institute of Geological Sciences, Harwell (England). Environmental Protection Unit.
FRACTURE ANALYSIS OF CRYSTALLINE ROCKS: FIELD MEASUREMENTS AND FIELD GEOMECHANICAL TECHNIQUES
T. J. McEwen 1980 78 p refs
(PB82-176678; ENPU-80-11) Copyright. Avail: NTIS HC A05/MF A01 CSCL 08G

The natural fractures occurring in crystalline rocks are described in terms of their occurrence in graphite masses and in metamorphic rocks. Their orientations are shown to be related to the paleo or present stresses which acted or act on the rocks, to the tectonic setting of the rock mass, and in some cases to any igneous banding that might exist. The analysis of fractures in surface outcrops and in boreholes is discussed in detail, and it is shown how estimates of fracture length, fracture area and fracture interconnectivity can be made from relatively simple measurements. The biases inevitably incurred during sampling are discussed in terms of their influence on the analyzed data, and methods for compensating for their effects are also included. The influence of the fracture surfaces on the mechanical properties of rock masses is described, and methods for measuring the shear strengths of fracture surfaces is discussed. The importance of the shear strength of rocks is analyzed in terms of their effects on determining the development of the fracture system. Finally the use of fracture orientations to determine the geotectonic stress field is discussed with examples from different tectonic environments. GRA

N83-12713# Autometric Corp., Inc., Falls Church, Va.
DETERMINATION OF THE CONTRIBUTION OF SIDE-LOOKING AIRBORNE RADAR TO STRUCTURAL GEOLOGIC MAPPING
Richard F. Pascucci, Alan F. Smith, and Judith E. Pearson Dec. 1981 125 p refs Sponsored by Geological Survey
(PB82-185042) Avail: NTIS HC A06/MF A01 CSCL 08G

To assist the U.S. Geological Survey in carrying out the Congressional mandate to investigate the use of side looking airborne radar (SLAR), Autometric, Inc. has conducted a research program to determine the unique, incremental contribution of SLAR imagery to structural geologic mapping. Imagery from two SLAR systems and from three other remote sensing systems was interpreted, and the resulting information was quantified and intercompared using a computer assisted geographic information system. The study area includes three U.S. Geological Survey quadrangles. Author (GRA)

N83-12714# Science Research Council, Chilton (England).
PROCEEDINGS OF A COLLOQUIUM: SPORADIC-E AND ITS IMPLICATIONS FOR RADIO COMMUNICATIONS
1981 85 p refs Colloq. held at Slough, England, 24 Feb. 1981
(PB82-186578; RL-81-079) Copyright. Avail: NTIS HC A05/MF A01 CSCL 04A

Sporadic E, the generic name for ionization irregularities which arise at E region heights in the ionosphere were examined. A number of separate physical causes, with associated different geographical and temporal morphologies are outlined. Their common features include intense ionization over a height range of only a few kilometers, irregularity blobs often elongated along the direction of the Earth's magnetic field with lengths of several kilometers contained in drifting patches extending over hundreds of kilometers and an intermitent occurrence from day to day. Current information on sporadic E relevant to communications, identifying limitations in this knowledge, and highlighting priority areas where more work is needed is reviewed. GRA

N83-12715# Environmental Sciences Research Lab., Research Triangle Park, N.C. Meteorology and Assessment Div.
DEPENDENCE OF NEPHELOMETER SCATTERING COEFFICIENTS ON RELATIVE HUMIDITY: FRONTS, NOCTURNAL DISTURBANCE AND WOOD SMOKE
George W. Griffing 1981 36 p refs
(PB82-188813; EPA-600/3-82-006) Avail: NTIS HC A03/MF A01 CSCL 04A

The dependence of the nephelometer scattering coefficient of atmospheric air on the relative humidity at the RTP is discussed for four different meteorological examples. These examples feature (1) the passage of a low pressure system with thunderstorms; (2) the passage of a cold, dry front; (3) a nocturnal weather disturbance due to an unknown source; and (4) wood smoke aerosols from burning tree piles. Nephelometer scattering coefficient data were obtained by the use of two nephelometers. One nephelometer was operated at the ambient outside relative humidity and the other nephelometer at a different relative humidity. Using this operational mode of data acquisition, qualitative temporal information was deducted on the variations of aerosol size and number density as various meteorological parameters vary. The temporal trend of the visibility is also discussed for each example. Author (GRA)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-12716# *Centre Meteorologique de Geneve (Switzerland).*
OBJECTIVE FORECASTING OF THE HEIGHTS OF PRECIPITATION AND OF RELATIVE INSOLATION BY MEANS OF DISCRIMINATORY ANALYSIS
J.-D. Altherr, M. Dupanloup, Y. Ganter, and E. Junet 1982 44 p refs In FRENCH; ENGLISH summary
(Rept-44; ISSN-0080-7348) Avail: NTIS HC A03/MF A01

In order to quickly obtain quantitative information from the numerical weather prediction charts, a method based on the discriminatory analysis giving estimates for precipitations and sunshine was developed. This method uses forecasts values of

the 500 mbar geopotential height at 16 points regularly distributed over Europe. S.L.

N83-12717# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY OF METEOROLOGICAL TIME SERIES. PART 2: APPLICATIONS OF AUTOREGRESSIVE MODELS
S. Srivatsangam and Vernon E. Kousky Aug. 1982 22 p refs Submitted for publication
(INPE-2519-PRE/194-Pt-2) Avail: NTIS HC A02/MF A01

Filtered series of daily data of temperature T', zonal wind u' and meridional wind v' at 850, 500 and 250 mb, containing only short (< 90 day) period spectral energy, are studied for the contiguous United States. A frequency f sub 0 is calculated using the first two lag correlation coefficients of each series. The frequency f sub 0 indicates the rate of decay of persistence (or autocorrelation) in the series. The f sub 0 of the difference T'850 - T'500, a measure of static stability o, is also calculated. The distribution of f sub 0 (sigma) is in good agreement with cyclone and anticyclone tracks in the nonsummer months. Where f sub 0 (sigma) exists, f sub 0 (V'250) and f sub 0 (V'500) also exist, but few, if any, points exhibit an f sub 0 for the variables U'250 and U'500. This means that in the region of frequent occurrence of synoptic weather systems, u' in the middle and upper troposphere has less high frequency spectral density than v'. The possible reasons for this are explored and it is suggested that the accumulation of spectral energy in the lower frequency oscillations of u' may be due to nonlinear interaction between the seasonal cycle and high frequency variations. In this context, the results are compared with atmospheric circulation model simulations. M.G.

N83-12718# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
HARDWARE DESCRIPTION OF MASS WEATHER DISSEMINATION SYSTEM EXPLORATORY ENGINEERING MODEL Final Report
Paul Quick Washington Sep. 1982 125 p refs
(FAA Proj. 131-402-540)
(FAA-RD-82-32; FAA-CT-81-56) Avail: NTIS HC A06/MF A01

The Mass Weather Dissemination System Exploratory Engineering Model currently being tested in the Flight Service Station Engineering Laboratory is described. The object of this effort is to investigate through development, test, and evaluation, the application of digital technology to the mass dissemination of meteorological and aeronautical information. The prototype model is a fully automated system designed to transfer a significant amount of workload from the flight service specialist to system hardware and to provide better service to the flying public. B.W.

N83-12719# Environmental Research and Technology, Inc., Concord, Mass.
RADAR ANALYSIS FOR SEVERE WEATHER DETECTION AND TRACKING Final Report, Jul. 1980 - Jun. 1982
Robert K. Crane Jul. 1982 92 p refs
(Contracts NA80RA-C-00110; DTFA01-81-Y-10521)
(FAA-RD-82-64; P-A579-F) Avail: NTIS HC A05/MF A01

The cell detection and tracking algorithms, were refined to incorporate Doppler radar derived estimates of tangential shear in the tracking process without significantly increasing the tracking error and the number of detected cell clusters. The Doppler data were subjected to a number of processing steps designed to minimize the false cell and cluster problem (false alarm rate). The revised thunderstorm hazard detection algorithm employs spatially filtered tangential shear data with a 10 dB minimum signal to noise ratio. Shear cell continuity in time is required to establish a volume cell in the absence of a reflectivity cell. Doppler radar data were analyzed to evaluate the refined algorithms. Tangential shear and Doppler spread (spectrum width) data were used separately for the detection of potentially hazardous regions. Intercomparison between isolated volume cells simultaneously detected by the Norman and Cimarron radars showed that both the shear and spread observations were aspect sensitive (anisotropic). S.L.

N83-12720# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CLIMATOLOGICAL STUDY OF THE INTERTROPICAL CONVERGENCE ZONE AND ITS INFLUENCE OVER THE NORTHEAST OF BRAZIL M.S. Thesis [UM ESTUDO CLIMATOLOGICO DA ZONA DE CONVERGENCIA INTERTROPICAL (ZCIT) E SUA INFLUENCA SOBRE O NORDESTE DO BRAZIL]
Paulo Roberto Valgas Lobo Sep. 1982 84 p refs In In PORTUGUESE; ENGLISH summary
(INPE-2534-TDL/101) Avail: NTIS HC A05/MF A01

A study on the relation between the seasonal and interannual variability of the ITCZ and the occurrence of rainfall anomalies in the northern part of Northeast Brazil was carried out by means of satellite imagery and precipitation data. Brightness charts were used to analyze the cloudiness distribution over Northeast Brazil and the South Atlantic. Different distributions were detected for the rainy (1974) and dry (1976) years, in regions far from the Northern Coast. This corroborates the hypothesis that rainfall over the Northeast may be influenced by large scale dynamic mechanisms. It is also noted that the ITCZ had a more southward position in 1974 than in 1976. Brightness charts show a more northward and more active ITCZ in summer, and a more southward and less active ITCZ in autumn. It is observed that in the wet period (March-April), when the convective activity is stronger over the Northeast, there is a simultaneous weakening of the ITCZ. This may be related to the variation in the position and intensity of the Walker circulation. Author

N83-12721# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A BAROCLINIC MODEL OF TWO LAYERS FOR USE IN NUMERICAL WEATHER FORECASTING [UM MODELO BAROCLINICO DE DUAS CAMDAS PARA USO EM PREVISAO NUMERICA DE TEMPO]
Rosalvo Pinheiro dosSantos, Yoshihiro Yamazaki, Marco Antonio M. Lemes, Prakki Satyamurty, and Sergio Henrigue Franchito Oct. 1982 37 p refs In PORTUGUESE; ENGLISH summary
(INPE-2547-RPE/421) Avail: NTIS HC A03/MF A01

A primitive equation limited area baroclinic model is discussed. The primitive equations, in the flux form, are written in sigma coordinate form for a two layer atmospheric model. This is to be the first multilevel model to be tested systematically in order to determine its performance in forecasting meteorological situations of relevance to South America. Author

N83-12722# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FORECASTING THE SERIES OF RAINFALLS AT FORTALEZA USING THE BURG MAXIMUM ENTROPY METHOD [PREVISIBILIDADA DE SERIE DE PRECIPITACAO DE CHUVAS DE FORTALEZA PELO METODO DA MAXIMA ENTROPIA DE BURG]
Ivan Jelinek Kantor Oct. 1982 45 p refs In PORTUGUESE; ENGLISH summary
(INPE-2546-RPE/420) Avail: NTIS HC A03/MF A01

Using an autoregressive prediction process calculated by the Burg maximum entropy method, the series of annual rainfall at Fortaleza, Ceara from 1849 to 1978 was analyzed. The calculations indicate a large prediction error compared with the data variance. In other words, the rainfall series at Fortaleza is not highly predictable. Author

N83-12723# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY ON INTERACTIONS BETWEEN SYNOPTIC SCALE CIRCULATING SYSTEMS AND LOCAL CIRCULATIONS M.S. Thesis - Feb. 1982 [UM ESTUDO SOBRE INTERACOES ENTRE SISTEMAS DE CIRCULACAO DE ESCALA SINOTICA E CIRCULACOES LOCAIS]
Iracema Fonseca de A. Cavalcanti Jul. 1982 134 p refs In PORTUGUESE; ENGLISH summary

(INPE-2494-TDL/097) Avail: NTIS HC A07/MF A01

The effects of large scale systems on land-sea breeze and on mountain-valley wind circulation, investigated. Convection associated with the sea breeze was verified by observing the formation of a line of cumulonimbi along the north-northeast coast of South America using satellite imagery. Climatological analysis of the occurrence of the convective line associated with the sea breeze show a variation in its location along the coast in the same direction as the seasonal variation of the intertropical convergence zone (ITCZ). The mean monthly analysis of divergence show that the ITCZ is better organized and more intense in winter, when the frequency of cumulonimbus development along the coast is high. At times, the convective activity associated with the sea breeze appears to be enhanced by the presence of low level convergence associated with the low latitude penetration of cold fronts. The development of strong convective activity during the night, in the region of Paraguay, is related to the subsynoptic circulation which develops between the Andes and the lower terrain to the east. The possible existence of a low level nocturnal jet, in the region of Paraguay, is suggested. The low level large scale flow produces favorable conditions for the formation of this jet. The presence of a synoptic system, favoring rising air motion, generally enhances convective activity caused by the local wind system. Author

N83-12724# World Meteorological Organization, Geneva (Switzerland).

GLOBAL WEATHER EXPERIMENT. THE GARP ATLANTIC TROPICAL EXPERIMENT (GATE) MONOGRAPH

Apr. 1982 462 p refs Prepared in cooperation with International Council of Scientific Unions, Rome

(GARP-Pub-Ser-25) Avail: NTIS MF A01; print copy available at WMO, Geneva

Papers on GATE objectives and techniques are presented. Large-scale mean state, synoptic-scale motions, boundary layer, and radiation studies are summarized. Tropical waves are analyzed theoretically. The A/B and B scale motions in the intertropical convergent zones are investigated. Clouds, convection, and the physics of the upper tropical ocean are examined. For individual titles, see N83-12725 through N83-12735.

N83-12725# Hydrometeorological Centre of the USSR (Moscow).

MAJOR TASKS OF GATE

M. A. Petrossiants *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 1-14 refs (For primary document see N83-12724 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva

A project which examines the effects of smaller tropical weather systems on large-scale (synoptic) circulation and develops numerical modelling and prediction methods is described. Tropical waves and disturbances (A scale), intertropical convergent zones (A, B scales) cloud clusters (B scale) and moist convection (C, D scales) and the planetary boundary layer are investigated. Among A, B, C and D scales and the basic state, spatial and phase relationships; and energy, momentum and moisture transports conversions and budgets, are studied. Ocean mixed layer - atmospheric forcing interaction is probed. Author (ESA)

N83-12726# National Center for Atmospheric Research, Boulder, Colo.

GATE OBSERVATIONAL STRATEGY: A LOOK IN RETROSPECT

Joachim P. Kuettner *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 15-26 refs (For primary document see N83-12724 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The GATE observational strategy, i.e., nested resolution from the cumulus scale, over meso and cloud cluster scales to the synoptic planetary scale in a longitude far enough from Africa to suppress continental influences, but within aircraft range, is assessed. The predetermined plan could only be changed if scientific objectives or participants' safety was jeopardized, or if unexpected natural phenomena forced changes. The strategy is successful, as, e.g., cloud cluster scale data on vertical distribution of heating, moisture, and precipitation, prove. A comprehensive quick look data set is of overriding importance, there is no need to wait for perfect data. Author (ESA)

N83-12727# Florida State Univ., Tallahassee. Dept. of Meteorology.

LARGE-SCALE MEAN STATE

T. N. Krishnamurti and R. J. Pasch *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 27-60 refs (For primary document see N83-12724 03-47)

(Grant NSF ATM-78-19363)

Avail: NTIS MF A01; print copy available at WMO, Geneva

The mean motion field, precipitation, cloud cover, sea-surface temperatures, oceanic wind stress, wind stress curl distributions, and heat balance of the upper ocean, recorded by GATE, are presented. The response of the maximum sea-surface temperature to net ocean heat gain is slow, so the warm axis persists in its northern position even after the "equatorward move" of the Sun. Surface streamlines, the rainfall belt, and the axis of maximum cloud cover move northwards with the axis of warm sea-surface temperature. Rainfall maximum over the eastern Atlantic occurs at 10 deg N, near west Africa. Over the western Atlantic the maximum rainfall axis is further north. Author (ESA)

N83-12728# National Hurricane and Experimental Meteorology Lab., Coral Gables, Fla.

SYNOPTIC-SCALE MOTIONS

Robert W. Burpee and Richard J. Reed (Washington Univ., Seattle) *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 61-120 refs Sponsored in cooperation with NOAA (For primary document see N83-12724 03-47)

(Grants NSF ATM-80-17245; NSF ATM-81-03697)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Data on African or easterly waves over west Africa and the eastern Atlantic, acquired during GATE, are summarized. Middle tropospheric flow satisfies the barotropic instability theory and the Charney-Stern criterion for the instability of an internal jet. A convergence region near the surface, in, and in advance of, the trough, and a corresponding divergence aloft (at 200 mb) are found. Strongest upward motions occur ahead of the trough. Largest wind and velocity fluctuations occur at 600 mb. Convective cloud and precipitation are greatest slightly ahead of the trough axis. Surface energy budget variations are caused primarily by net radiation. A detrainment level at 200 mb, and one at the surface are reported. Main wave growth during GATE phase 3 takes place between 30 deg E and the Greenwich meridian. Author (ESA)

N83-12729# Academy of Sciences (USSR), Moscow. Inst. of Atmospheric Physics.

THEORETICAL STUDIES OF TROPICAL WAVES

E. M. Dobryshman *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 121-181 refs (For primary document see N83-12724 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva

Nonlinear processes in meso and cumulus scale disturbances which occured during GATE were studied. Small-scale waves in the narrow equatorial belt, waves in the 5 deg to 15 deg latitudinal belt (where variation with coordinate of coefficients strongly affects wave parameters), resonant interaction of wave triplets, and solitary, soliton type waves are discussed. Direct determination of wave characteristics (diurnal and semidiurnal periods), and determination of periodic components from wave spectra power functions are described. A modified CISK model, in which time scales of unstable long waves are reduced to from 5 to 15 days, is presented. All modes of inertia-gravity waves in the model can be stable. The adjustment period is 12 hr if the wave amplitude of the heat source is of reasonable value. Barotropic instability is the main cause of wave generation. Author (ESA)

N83-12730# Meteorological Office, Bracknell (England).

LARGE-SCALE NUMERICAL MODELLING

A. Gilchrist, P. R. Rowntree, and D. B. Shaw *In* WMO Global

Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 121-181 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

Objective analyses and numerical modelling, using GATE data, are discussed. The sensitivity of tropical predictions to initial surface data, initial atmospheric data, and model formulations is considered. Two optimum interpolation techniques were used. In one, the optimum interpolation (used to determine spatial interpolation of observational data) is applied independently to temperature, wind, and surface pressure. The repeated insertion technique produces the mass-wind balancing. In the second technique, height-wind field imbalances are brought towards geostrophic balance by a variational adjustment (to height and wind) after the optimum interpolation. Predictions are sensitive to sea surface temperature, mountain elevations, and soil moisture specifications. Sensitivity to initial analyses of geopotential and relative humidity is evident. The effects of grid length, and boundary layer and surface fluxes are unclear. The omission of radiation parameters can change results significantly. Energy conversions are enhanced when cloud feedback is included in models. Author (ESA)

N83-12731# Kiel Univ. (West Germany). Inst. fuer Meereskunde.
PHYSICS OF THE UPPER TROPICAL OCEAN
Gerold Siedler and George Philander (Princeton Univ.) *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 219-235 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The variability of the tropical Atlantic was studied. Data on surface temperature changes, vertical heat flux, and the primary processes redistributing heat in the upper ocean were collected, in order to examine ocean-atmosphere interaction. Results show that either long-term mean surface fluxes, or the spectral properties of fluctuations in these fluxes, can be related to the mixed layer heat content in the tropical Atlantic. For inertia-gravity waves, a strong near-inertial peak is found in the internal waveband, and a peak occurs at semidiurnal tidal frequency. A third energetic band exists at medium depth Brunt-Vaeisaelae frequency in the upper layer. The internal wave field behaves differently at high and low frequencies. Energetic periodic fluctuations in the equatorial current regime remove kinetic energy from the mean flow, driven by the large-scale wind stress field. Thermocline data show the area to be in equilibrium with varying winds, on a seasonal time scale. Author (ESA)

N83-12732# Hydrometeorological Centre of the USSR (Moscow).
A/B AND B SCALE MOTION AND BALANCES IN THE ITCZ AREA
A. I. Falkovich *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 237-273 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The interactions of scales of motion in the intertropical convergent zone are discussed, using GATE data on wind shear, cloudiness, precipitation and water and air temperature. Large-scale upward motions restructure stratification, and cause convective instability of the atmosphere. The later results in moist penetrative convection, tending to restore the initial vertical temperature and moisture distribution. Moist convection, when enhanced, can cause an extension and intensification of the boundary layers, and the creation of the warm core of the disturbances. Growth of small-scale turbulent friction in the boundary layers leads to the increase of large-scale convergence (divergence) and of large-scale upward motions. An increased warm core of the disturbance is followed by enhanced temperature and pressure gradients, and intensity of the disturbance. Author (ESA)

N83-12733# Academy of Sciences (USSR), Moscow. Inst. of Atmospheric Physics.
BOUNDARY LAYER PHENOMENA: (1) THE SURFACE LAYER (AIR-SEA INTERACTION AND ITS PARAMETERIZATION); (2) THE STRUCTURE OF THE ATMOSPHERIC BOUNDARY LAYER UNDER DIFFERENT CONVECTIVE CONDITIONS
Y. A. Volkov, Ernst Augstein (Max-Planck Inst. fuer Meteorologie), and Hans Hinzpeter (Max-Planck Inst. fuer Meteorologie) *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 345-387 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The GATE boundary layer data were used to study the influence of deep cumulus convection on the structure of the lower atmosphere. Near the sea surface, heat transfer is attributed to relatively small scales of motion, while water vapor and momentum are transported by larger elements. Parameterization of momentum and heat fluxes by bulk aerodynamic equations with constant transfer coefficients, is possible if uncertainty of + or - 25 % is admitted. Horizontal velocity divergence and advection of water vapor in the lower troposphere control the development of deep cumulus convection. Vertical mass transport by convective cloud updrafts overbalances air mass supply through large-scale horizontal flow convergence in the lower cloud area. Although modelling the lower atmosphere throughout the cloud cycle is unsatisfactory, periods of low convective activity and of decaying clouds can be treated, even by one-dimensional boundary layer concepts. Atmospheric models for precipitating-convection conditions must include the three-dimensional motion field and detailed cloud parameterization. Author (ESA)

N83-12734# Academy of Sciences (USSR), Moscow. Inst. of Atmospheric Sciences.
RADIATION PROCESSES AND THEIR PARAMETERIZATION
E. M. Feigelson, K. Y. Kondratyev (Main Geophysical Obs., Leningrad), and M. A. Prokofyev (Main Geophysical Obs., Leningrad) *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 389-466 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The dynamics of the tropical atmosphere, radiation-cloudiness interactions and the spatial-temporal distribution of radiative fluxes and flux divergences were studied during GATE. Radiation was measured at the ocean surface and in the free atmosphere. Tropical cloudiness was modelled mathematically. Radiometer data on the heat radiation field are presented. Significant discrepencies between calculated and measured long wave flux divergences are considered. The variability of solar radiation reaching the ocean surface is shown to depend on atmospheric aerosol composition. The radiative effects of the Saharan aerosol are discussed. The sensitivity of atmospheric circulation models to radiation-cloudiness interactions, and to the type of surface above which the convection occurs, is stressed. Author (ESA)

N83-12735# Hydrometeorological Centre of the USSR (Moscow).
MAIN ACHIEVEMENTS OF GARP ATLANTIC TROPICAL EXPERIMENT (GATE) AND ITS IMPACT ON FGGE
M. A. Petrossiants *In* WMO Global Weather Expt. The GARP Atlantic Tropical Expt. (GATE) Monograph Apr. 1982 p 467-477 refs (For primary document see N83-12724 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva

The GATE results, concerning large-scale mean state, easterly waves, large-scale numerical modelling, oceanography, the intertropical convergent zones, convection, boundary layers, and radiation, are summarized. Observational techniques developed during GATE are described and the use of GATE experience for the implentation and management of FGGE is discussed. Author (ESA)

N83-12736# World Meteorological Organization, Geneva (Switzerland).
TECHNICAL CONFERENCE ON CLIMATE: AFRICA
1982 541 p refs In ENGLISH and FRENCH Conf. held at Arusha, United Republic of Tanzania, 25-30 Jan. 1982 (WMO-596; ISBN-92-63-00596-6) Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Ways of using climatological data and knowledge to improve

the efficiency of major economic activities and to alleviate the hazards of extreme climatic conditions were discussed. Food production, energy and water resources, and land use were studied. For individual titles, see N83-12737 through N83-12765.

N83-12737# Nairobi Univ. (Kenya). Dept. of Meteorology.
THE CLIMATE OF AFRICA, INCLUDING FEASIBILITY STUDY OF CLIMATE ALERT SYSTEM
G. C. Asnani *In* WMO Tech. Conf. on Climate: Africa 1982 p 101-129 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The state of the art of climatology is reviewed, and the main influences on, and regional variations of, the climate of Africa are discussed. A medium and long-range weather forecasting system which predicts climate hazards and the impact of climate on society is proposed. The advantages of satellite meteorology are considered. Exploitation of inexhaustible energy sources (Sun, wind) is mentioned. Author (ESA)

N83-12738# Direction de la Meteorologie Nationale, Paris (France).
POSSIBILITY OF DETERMINING DROUGHT PROBABILITY AND USING IT IN DECISION MAKING
D. Lambergeon *In* WMO Tech. Conf. on Climate: Africa 1982 p 132-143 refs In FRENCH; ENGLISH summary (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Knowledge of Sahelian rainfall is reviewed, and the application of simple statistical methods to its analysis is considered. Seasonal prediction using evolution models based on physical laws, and using empirical atmospheric models which exploit statistical analysis is discussed. Evolution models are beyond present possibilities for operational prediction, but empirical model based prediction is feasible if international cooperation in data analysis/acquisition and parameter identification is forthcoming. The importance of parameters other than rain for agriculture is underlined. Author (ESA)

N83-12739# Nairobi Univ. (Kenya). Dept. of Meteorology.
CHARACTERISTICS OF THE TROPOSPHERIC MEAN WIND FLOW OVER AFRICA DURING NORTHERN WINTER SEASON
P. M. R. Kiangi and E. J. Mpeta *In* WMO Tech. Conf. on Climate: Africa 1982 p 144-155 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The three-dimensional distribution of the mean horizontal motion over Africa during December, January, and February was analyzed using sonde data for seven standard pressure levels. Results reveal organized cyclonic vortices in the southern hemisphere, the northeast monsoon wind systems of the west Indian Ocean, and anticyclonic circulation over west, and south Africa at 850 and 700 mb. Analysis of the divergence field shows that Indian Ocean monsoon is divergent in certain areas of east Africa. In the equatorial region it is convergent at 850 and 700 mb, but divergent higher up. In west Africa, the field is divergent at 850 mb, with the thickest convergence layers corresponding to heaviest precipitation. Author (ESA)

N83-12740# Nairobi Univ. (Kenya). Dept. of Meteorology.
THE MEAN HORIZONTAL MOTIONS OVER THE AFRICAN ATMOSPHERE DURING THE SOUTHERN SUMMER
E. K. Anyamba, P. M. R. Kiangi, and J. K. Patnaik *In* WMO Tech. Conf. on Climate: Africa 1982 p 156-170 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Three-dimensional distribution of the mean horizontal motion over Africa in January was analyzed using sonde data for seven standard pressure levels. Results reveal a pronounced subtropical jetstream over northern Africa and a weak one over southern Africa, between 300 and 150 mb; anticyclonic cells over northern and southern Africa; a belt of easterlies spreading from 27N to 25S at 850 mb, decreasing in breadth with altitude; and a belt of westerlies which almost envelopes the whole of northern Africa in the upper troposphere. Large parts of the Sahara and Kalahari deserts are divergent in the lower troposphere and convergent in middle and upper troposphere. The NE monsoon of Eastern Africa is divergent in the lower layers and convergent aloft. The intertropical convergent zone is convergent in the layer 850 to 700 mb and divergent in the upper layers. A large part of the Northern Hemisphere portion of Africa has anticyclonic vorticity in the middle and lower troposphere. Author (ESA)

N83-12741# World Meteorological Organization, Geneva (Switzerland).
SUMMARY OF THE CLIMATOLOGICAL DATA SITUATION IN AFRICA c45
E. G. Davy *In its* Tech. Conf. on Climate: Africa 1982 p 171-187 (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Climatological data acquisition and analysis in Africa from the 1930's onwards, and the use of these data in development programs are discussed. Recently founded services, especially in tropical Africa, tend to concentrate on establishing basic station networks, and aeronautical meteorology, with the danger that data collection becomes an end in itself. There is also a risk that, because of a lack of experienced climatologists, data are not used as fully as possible, e.g., by agronomists or hydrologists. Author (ESA)

N83-12742# Food and Agriculture Organization of the United Nations, Rome (Italy).
USE OF CLIMATIC INFORMATION FOR LAND USE PLANNING AND CROP DIVERSIFICATION
Michel Frere *In* WMO Tech. Conf. on Climate: Africa 1982 p 188-193 (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The FAO agroclimatology surveys, agroecological zones project and agroclimatological activities concerning specific crops are discussed. The surveys investigate climate-agriculture interactions in areas particularly exposed to climatic hazards, in order to introduce appropriate analytical methods, and to help agriculture adapt to the environment. The zones project established an inventory of present and potential land use for rainfed agriculture in developing nations. Mixed/relay cropping and improved varieties were introduced in areas with appropriate climate. Author (ESA)

N83-12743# Nairobi Univ. (Kenya). Dept. of Meteorology.
THE WEATHER ANOMALIES DURING THE NORTHERN SUMMERS OF 1972 AND 1978 OVER AFRICA
W. S. M. Minja *In* WMO Tech. Conf. on Climate: Africa 1982 p 194-207 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Atmospheric anomalies which led to abnormally dry weather conditions in 1972 and abnormally wet conditions in 1978 were investigated. Motion vectors of the transient systems and spectral characteristics of fluctuations of wind, temperature, dew point temperature and relative humidity were studied. The transient wind vector was obtained by vector addition of the transient zonal and meridional components, using ten year data as normals. Dew point temperature was obtained by subtracting the dew point depression from the temperature. Relative humidity was calculated using temperature and dew point temperature. Streamline analysis of transient vector wind depict areas of active weather as centres of cyclonic indraft or areas of confluence. Spectral analysis of wind reveal either biennial, annual or semi-annual oscillation(s). Author (ESA)

N83-12744# Reading Univ. (England). Dept. of Applied Statistics.

DETERMINING OPTIMUM PLANTING DATE BY ANALYSIS OF RAINFALL DATA AT MOROGORO, TANZANIA

Richard Coe and John Dumelow *In* WMO Tech. Conf. on Climate: Africa 1982 p 208-221 refs Prepared in cooperation with Dar es Salaah Univ., Tanzania (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Analysis of rainfall data by considering the chance of long dry spells occurring, or by a simple water balance model, were compared for a maize growing area. The probability of crop failure obtained using the rainfall modeling approach is high, even when the optimum planting date is used. This probability is realistic for Morogoro, however, since maize is not ideally suited to the region. Almost identical results are obtained for both methods. Author (ESA)

N83-12745# East Anglia Univ., Norwich (England). Unite de Recherche Climatique.

STRATEGIES FOR THE AMELIORATION OF AGRICULTURAL DROUGHT IN AFRICA

J. P. Palutikof, G. Farmer, and T. M. L. Wigley *In* WMO Tech. Conf. on Climate: Africa 1982 p 222-227 refs (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Ways to reduce the effects of drought are considered, using Kenya as an example. Through the construction of scenarios, long-term advance identification can be made of areas where unacceptably high drought frequency may result from expected changes in land use, settlement patterns, population and climate. Short term drought prediction within the growing season allows forward planning of techniques of diminishing the impact of drought. Spatial compensation zones can be developed in order to provide grain reserves and supplies for use when crops fail in the main food-producing regions. Author (ESA)

N83-12746# Meteorological Office, Bracknell (England).

THE ROLE OF CLIMATOLOGICAL INFORMATION IN THE PROTECTION OF PLANTS AND ANIMALS

C. V. Smith *In* WMO Tech. Conf. on Climate: Africa 1982 p 249-272 (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Interactions between weather and crops and animals, weather and diseases and pests, and between weather and husbandry are reviewed. The role of meteorological and climatological data in analyzing these problems is discussed. The need to vary observational strategy to cope with phenomena whose time scale is one season, and those with longer term development is stressed. Observation should cover regularly occurring meteorological incidents, and a health risk index for the season following these should be established. Meteorological variables should be translated into indexes of evolutionary phase or population of parasites and disease carriers. Data should be distributed along with information on the choice and effectiveness of countermeasures. Author (ESA)

N83-12747# Food and Agriculture Organization of the United Nations, Rome (Italy).

AGROMETEOROLOGICAL MONITORING FOR CROP PREDICTION

G. F. Popov *In* WMO Tech. Conf. on Climate: Africa 1982 p 273-285 In FRENCH; ENGLISH summary (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

A crop prediction method based on a cumulative water balance established for successive 10-day periods for a given crop is presented. Stages in calculating the cumulative water balance are listed on a calculation sheet, which comprises: normal 10-day precipitation; current 10-day precipitation; number of rainy days; potential evapotranspiration; crop coefficient; crop water requirement; difference between current precipitation and water requirement; usable available water reserves in the soil; water surplus or deficit; index showing cumulatively, in the form of a percentage, the degree to which crop water requirement is met up to a particular stage in its growth cycle. Direct relationships are shown to exist between the index and yields. Author (ESA)

N83-12748# Food and Agriculture Organization of the United Nations, Rome (Italy).

PREDICTION OF RANGE PRODUCTION FROM WEATHER RECORDS IN AFRICA

H. N. LeHoueron *In* WMO Tech. Conf. on Climate: Africa 1982 p 286-298 refs (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Literature on the prediction of marketable livestock produced by a given range, through analysis of weather records, was reviewed. Although production is closely related to evapotranspiration, prediction cannot be very accurate due to large variations over time in rainfall distribution, and to soil and vegetation factors. Crude estimates can be found over large areas, and in arid to subhumid zones, where actual evapotranspiration is almost equal to precipitation. Range and soil types, and management methods must be accounted for in analysis, since each of these can cause variation from geographical averages greater than climate related variations. Author (ESA)

N83-12749# Meteorological Office, Bracknell (England).

CLIMATOLOGICAL ASPECTS OF IN-HARVEST AND POST-HARVEST LOSSES

C. V. Smith *In* WMO Tech. Conf. on Climate: Africa 1982 p 299-309 refs (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Qualitative and quantitative harvest losses due to meteorological, biological, and technological factors are discussed, and the role of climatological data in reducing these losses is outlined. These data can be used to assess whether a crop is suited to a given area, or whether farming tactics, e.g., planting date, are appropriate. They can be used to plan storage and transport facilities by predicting moisture and temperature changes, for example, when crossing climate zones, or associated with container materials. Author (ESA)

N83-12750# Food and Agriculture Organization of the United Nations, Rome (Italy).

RAINFALL VARIABILITY, TYPES OF GROWING SEASONS AND CEREAL YIELDS IN TANZANIA

R. Gommes and M. Houssiau *In* WMO Tech. Conf. on Climate: Africa 1982 p 310-324 refs (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Seven agroclimatic types of growing season were established for Tanzania by calculating the probability of monthly precipitation being higher than required by the main cereal crop. Crops suited to each season and region are indicated. Data suggest that a water supply limited to 75% of midseason requirements reduces corn production by 50% and sorghum by 20%. Author (ESA)

N83-12751# Institut National de la Recherche Agronomique, Avignon (France). Dept. de Bioclimatologie.

STUDY OF GROUND WINDS IN UPPER VOLTA: ECONOMIC AND AGRONOMIC CONSEQUENCES FOR THE SUDAN-SAHEL REGION OF WEST AFRICA

C. Baldy, R. Delecolle (Direction de la Meteorologie, Upper Volta), and H. Kontongomde *In* WMO Tech. Conf. on Climate: Africa 1982 p 325-332 In FRENCH; ENGLISH summary (For primary document see N83-12736 03-47)

Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Ground winds in the cold, dry season (December-January) and the wet season (July) in Upper Volta were analyzed. The utility of

windbreaks, and wind energy conversion were studied. Wind velocity alone does not justify the construction of windbreaks, although they could protect crops from blown sand, or prevent water vapor exchange between the protected area and its environment. Winds are regular, with a marked velocity increase then decrease between 9 am and 5 pm. Even very gentle valleys can reduce wind velocity, so generators should be placed on hilltops, even though irrigation pumps are lower down.
Author (ESA)

N83-12752# Ministry of Agriculture, Zanzibar (Tanzania).
CLIMATIC EFFECTS ON SOIL EROSION IN ZANZIBAR
A. I. Khatibu, R. K. Jana (Dar es Salaam Univ., Tanzania), and R. Lal (IITA, Nigeria) *In* WMO Tech. Conf. on Climate: Africa 1982 p 333-347 refs Sponsored by Ford Foundation, Africa (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Soil erodability for a plowed bare soil surface and a no-till mulched area were measured in 10% slope runoff plots. Runoff loss of rainfall received is 10.2% for bare fallow, 0.01% for mulched; total nutrient loss is 14.2 times greater in bare fallow. Total nutrient loss runoff is significantly correlated with rainfall kinetic energy and amount per storm. Author (ESA)

N83-12753# Hydrometeorological Centre of the USSR (Moscow).
THE EFFECT OF CLIMATIC VARIABILITY ON AGRICULTURE AND OF AGRICULTURAL ACTIVITIES ON CLIMATE
Y. A. Khvalensky *In* WMO Tech. Conf. on Climate: Africa 1982 p 348-359 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Knowledge of climate-agriculture interaction is summarized, and ways to reduce the vulnerability of agriculture to climatic variations are outlined. Natural disasters cause $40 billion damage annually, 75% of which is in developing nations. Agriculture affects climate by enhancing Earth albedo. The use of 1 ton of nitrogenous fertilizers causes $310 loss, but benefits can exceed $2500 to 3000. Irrigation enhances total evaporation.Author (ESA)

N83-12754# National Weather Service, Silver Spring, Md. Hydrologic Services Div.
CLIMATIC ASPECTS OF PLANNING IMPOUNDMENTS AND HYDROPOWER OPERATIONS
John C. Schaake *In* WMO Tech. Conf. on Climate: Africa 1982 p 360-374 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The representativeness of past experience of climate for prediction, the sensitivity of streamflow to climate variability, and the social and economic benefits deriving from design or operations decisions for given streamflow conditions are discussed. It is found that future periods exhibit climate conditions that vary from period to period, but these variations can be accounted for on the basis of historical experience augmented by regional analysis of this experience and the use of long term information such as might be found in dendroclimatic studies of tree rings. The representativeness of climate information for the short run requires research to develop quantitative methods. The effect of climate variability on streamflow can be accounted for with conceptual hydrology models, or with a generalized water balance model, or a drought index. Author (ESA)

N83-12755# World Meteorological Organization, Geneva (Switzerland).
APPLICATION OF CLIMATE DATA AND INFORMATION IN THE MANAGEMENT OF WATER RESOURCES
Gabor Kienitz *In its* Tech. Conf. on Climate: Africa 1982 p 375-385 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The collection and exploitation of climate data in regions with abundant and scarce water supplies is discussed. Data uses, including flood and drought prediction, are cited. Water resources projects, e.g., the WMO AGRHYMET project, are described.
Author (ESA)

N83-12756# Makerere Univ., Kampala (Uganda). Dept. of Geography.
ARIDITY IN EAST AFRICA: CLIMATIC GEOMORPHOLOGY OF WATER RESOURCES
Joseph P. B. M. Ouma *In* WMO Tech. Conf. on Climate: Africa 1982 p 386-393 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The climatic and geomorphic origins of east African aridity are traced, and strategies for combatting aridity are proposed. Analysis indicates fundamental oscillatory changes since the early Pleistocene era. The landscape of arid and semiarid east Africa is maladjusted to current climate, and aridity is aggrevated by pastoralism. Groundwater reserves were destroyed by tectonic movements. The creation of agroecological zones, with land use adapted to local conditions, is advocated. Author (ESA)

N83-12757# Department of Lands, Valuation and Water, Lilongwe (Malawi). Water Resources Branch.
THE IMPORTANCE OF CLIMATE CHANGE ON THE WATER BALANCE OF LAKE MALAWI
C. H. R. Kidd and Y. C. Mhone *In* WMO Tech. Conf. on Climate: Africa 1982 p 394-397 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Planning problems, particularly for hydroelectric power schemes, caused by climate fluctuations around Lake Malawi, are discussed. Direct precipitation, the main input to the water balance of the Lake Malawi-River Shire system, has increased steadily since 1900. However, it is impossible to forecast long term trends because of the stochastic nature of climate changes. The effects of bush burning on evaporation are also difficult to estimate. Author (ESA)

N83-12758# Indian Inst. of Tropical Meteorology, Poona. Field Research Unit.
METHODOLOGIES FOR ASSESSING SOLAR ENERGY POTENTIAL
Anna Mani *In* WMO Tech Conf. on Climate: Africa 1982 p 404-418 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Direct measurement, and calculation, of global, diffuse, and direct solar radiation are discussed. Campbell-Stokes sunshine recorders, Angstrom compensation and thermoelectric pyrheliometers and thermoelectric pyranometers are recommended. Computation of solar radiation from extraterrestrial radiation, other meteorological elements such as duration of bright sunshine and cloudiness using regression techniques, and satellite observations are considered. For solar energy projects, radiation and sunshine data for six years should be collected in a specially constructed network. Author (ESA)

N83-12759# Riso National Lab., Roskilde (Denmark). Meteorology Section.
METHODOLOGIES FOR ASSESSING WINDPOWER POTENTIAL
Erik L. Petersen and Ib Troen *In* WMO Tech. Conf. on Climate: Africa 1982 p 419-427 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Meteorological and climatological aspects of estimating the annual mean power production of wind turbines, particularly estimation of wind speed distribution as a function of terrain type and height, are discussed. This distribution can be obtained from

the time series of synoptic scale forcing, a drag law, and empirical wind profile expressions. Because pressure data collection is time consuming, the climatology of the forcing can be established from wind speed records of very homogeneous areas, e.g., airports. The method is only applicable to nonmountainous areas.
Author (ESA)

N83-12760# Sheffield Univ. (England). Dept. of Building Science.
CLIMATOLOGICAL ASPECTS OF BUILDING WITH SPECIAL REFERENCE TO WIND RELATED PHENOMENA
Brian E. Lee *In* WMO Tech. Conf. on Climate: Africa 1982 p 428-435 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The need to integrate climatological considerations with building design, construction, and operation is pointed out. Types of data relevant to localized air pollution, extreme loading, provision of shelter (for crops and people) and natural ventilation are discussed. Wind loading codes of practice which use an extreme gust design wind speed and hourly mean design wind speed are considered.
Author (ESA)

N83-12761# Zurich Univ. (Switzerland). Biological Central Lab.
THE SIGNIFICANCE OF AFRICAN CLIMATE IN HUMAN HEALTH
Wolf H. Weihe *In* WMO Tech. Conf. on Climate: Africa 1982 p 436-456 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The homeothermic functions of the human body are outlined, and the adaptation of the body to African conditions is discussed. The climate facilitates the survival, distribution and development of parasites which cause communicable diseases, and supports the life of vector animals. For humans, it favors life outdoors, without protective clothing and advanced housing with all the facilities which make sanitary controls possible. As a result many communicable diseases are endemic in the areas north and south of the equator. The Sahara provides a northern barrier against the spread of vector animals, while in the south they extend to higher latitudes as there are few geographic limitations.
Author (ESA)

N83-12762# Dar-es-Salaam Univ. (Tanzania). Bureau of Resource Assessment and Land Use Planning.
CLIMATOLOGICAL ASPECTS OF HUMAN SETTLEMENTS IN AFRICA
Adolfo Mascarenhas *In* WMO Tech. Conf. on Climate: Africa 1982 p 457-477 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Climatic influence on settlement in arid, semiarid, and tropical regions is discussed and the relationship between settlement and rainfall in east Africa is examined. Efforts to overcome drought problems in central Tanzania are described. Human comfort and microclimate is considered. The need to consider climate as a resource, and to direct research towards exploiting rather than describing it is stressed.
Author (ESA)

N83-12763# National Univ. of Benin, Cotonou.
SOME CLIMATOLOGICAL ASPECTS OF THE DEVELOPMENT OF DRAINAGE SYSTEMS IN URBAN AREAS
Abel A. Afouda *In* WMO Tech. Conf. on Climate: Africa 1982 p 478-489 refs In FRENCH; ENGLISH summary (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Models of rainfall-discharge transformation are examined and a theoretical model of runoff based on the basic equations of hydrodynamics is presented. The deterministic interpretation of this model establishes explicitly the relationship existing between conceptual models with storage components and the Navier-Stokes equations based on physical considerations. The stochastic interpretation of the model enables a probabilistic relationship to be established between: precipitation and the hydrological state of the basin characterized by the transformation function; and between transformation function and the runoff rate at basin outlet.
Author (ESA)

N83-12764# Clark Univ., Worcester, Mass. Center for Technology, Environment and Development.
ASSESSING THE IMPACT OF CLIMATE ON SOCIETY: A RESEARCH REVIEW
William E. Riebsame *In* WMO Tech. Conf. on Climate: Africa 1982 p 490-520 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

Literature on climate-society interaction from Hippocrates onwards was reviewed. Two approaches were identified: the impact model and the interaction model. The first sees climate as a factor in long-term human development, and is used to explain cultural differences. The second approach regards climate as a factor in short-term variations in the success of human endeavors.
Author (ESA)

N83-12765# World Meteorological Organization, Geneva (Switzerland).
MANPOWER RESOURCES IN AFRICA: TRAINING REQUIREMENTS AND OPPORTUNITIES
Samuel Mbele-Mbong *In its* Tech. Conf. on Climate: Africa 1982 p 521-535 refs (For primary document see N83-12736 03-47)
Avail: NTIS MF A01; print copy available at WMO, Geneva SW FR 35

The status of meteorological and climatological education in Africa was reviewed, and ways in which the WMO and other organizations can help developing nations in these fields were identified. The need to match training to local facilities and requirements, rather than follow programs suited to developed countries with greater resources, is stressed.
Author (ESA)

N83-12766# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
AIR WEATHER SERVICE (AWS) CLIMATIC BRIEFS: NORTH AMERICA
May 1982 291 p Supersedes USAFETAC/DS-79/088 (AD-A118448; AD-E850185; USAFETAC/DS-81/054; USAFETAC/DS-79/088) Avail: NTIS HC A13/MF A01 CSCL 04/2

The AWS Climatic Briefs provide summarized monthly and annual climatic data for specific locations. Different data summaries provide the information for different geographical areas. These areas are: North America (including Greenland and Bermuda); Latin America (including Mexico, West Indies, and dependent islands): Europe (including North Atlantic islands); USSR and Mongolian Peoples Republic; Peoples Republic of China (no Climatic Briefs at this time); Asia (Turkey and Cyprus to Indonesia and Japan); Africa (including Malagasy); and Antarctica, Australia, and Oceania. Meteorological elements included are: temperature, precipitation, relative humidity, vapor pressure, dew point, pressure altitude, surface wind, mean cloud cover, thunderstorm and fog days, flying weather, and typhoon and hurricane data.
GRA

N83-12767# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
MATHER AFB, CALIFORNIA. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report
4 Jun. 1982 442 p
(AD-A118461; USAFETAC/DS-82/033; SBI-AD-E850192) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Mather AFB, California. It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and

extreme values); (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet bulb and dew point temperature and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12768# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.

A CLIMATOLOGICAL STUDY OF THE AFGL MESONETWORK, VOLUME 1 Final Scientific Report

H. Albert Brown 11 Jan. 1982 61 p refs 2 Vol.

(AF Proj. 6670)

(AD-A118766; AFGL-TR-82-0011(1); AFGL-ERP-764-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 04/2

This study represents the first step in the development and analysis of an edited mesoclimatological data base of four years of observations by the 26 automated weather stations of the AFGL Mesonetwork. The first section describes the station network that existed during the period of operation, September 1972 through July 1976; the weather instruments that were utilized in the network; and the methodology of the data-editing routine. In the final section, the climatology derived from one year of data for half of the stations is presented. Selection of stations was based on topographic features or location in the network. Sites represented are located at towers, runways, swamps, valleys, hills and, finally, at the coast line. GRA

N83-12769# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

AIR WEATHER SERVICE (AWS) CLIMATIC BRIEFS: LATIN AMERICA

May 1982 30 p Supersedes USAFETAC/DS-79/089

(AD-A118449; AD-E850186; USAFETAC/DS-81/055; USAFETAC/DS-79/089) Avail: NTIS HC A03/MF A01 CSCL 04/2

The AWS Climatic Briefs provide summarized monthly and annual climatic data for specific locations. Different data summaries provide the information for different geographical areas. These areas are: North America (including Greenland and Bermuda); Latin America (including Mexico, West Indies, and dependent islands): Europe (including North Atlantic islands); USSR and Mongolian Peoples Republic; Peoples Republic of China (no Climatic Briefs at this time); Asia (Turkey and Cyprus to Indonesia and Japan); Africa (including Malagasy); and Antarctica, Australia, and Oceania. Meteorological elements included are: temperature, precipitation, relative humidity, vapor pressure, dew point, pressure altitude, surface wind, mean cloud cover, thunderstorm and fog days, flying weather, and typhoon and hurricane data. GRA

N83-12770# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

YOUNGSTOWN MAP, OHIO. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report

10 May 1982 485 p

(AD-A118509; AD-E850193; USAFETAC/DS-82/034-Pt-A-F) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Youngstown MAP, Ohio. It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values; (3) Surface Winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12771# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

SEATTLE TACOMA IAP, WASHINGTON. REVISED UNIFROM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report

21 Jun. 1982 450 p

(AD-A118508; AD-E850197; USAFETAC/DS-82/038-Pt-A-F) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report is a six-part statistical summary of surface weather observations for Seattle/Tacoma IAP, Washington It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values; (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperature and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12772# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

BITBURG AIR BASE, WEST GERMANY. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report

29 Jun. 1982 400 p

(AD-A118507; AD-E850198; USAFETAC/DS-82/039-Pt-A-F) Avail: NTIS HC A17/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Bitburg AB, West Germany. It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values; (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12773# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

NATRONA COUNTY/CASPER, WYOMING. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report

10 Jul. 1982 453 p

(AD-A118506; AD-E850200; USAFETAC/DS-82/041-Pt-A-F) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Natrona Co/Casper, Wyoming. It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values; (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations,

and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12774# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
DAGGETT MUNICIPAL, CALIFORNIA. REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO), PARTS A-F Final Report
2 Jul. 1982 515 p
(AD-A118505; AD-E850199; USAFETAC/DS-82/040-Pt-A-F) Avail: NTIS HC A22/MF A01 CSCL 04/2

This report is a six part statistical summary of surface weather observations for Daggett Municipal, California. It contains the following parts: (1) Weather conditions; Atmospheric phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12775# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). PARTS A-F: OSAN AB, KOREA Final Report
14 Jun. 1982 431 p Supersedes USAFETAC/DS-78/007
(AD-A118472; AD-E850194; USAFETAC/DS-82/035; USAFETAC/DS-78/007) Avail: NTIS HC A19/MF A01 CSCL 04/2

This report is a six-part statistical summary of surface weather observations for Osan AB, Korea. It contains the following parts: (1) Weather Conditions; Atmospheric Phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12776# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). PARTS A-F: ALBANY COUNTY APT, NEW YORK Final Report
14 Jun. 1982 470 p
(AD-A118471; AD-E850195; USAFETAC/DS-82/036) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report is a six-part statistical summary of surface weather observations for Albany County APT, New York. It contains the following parts: (1) Weather Conditions; Atmospheric Phenomena; (2) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (3) Surface winds; (4) Ceiling versus Visibility; Sky Cover; (5) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (6) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12777# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO). FORT KNOW/GODMAN AAF, KENTUCKY, PARTS A-F Final Report
13 Jul. 1982 463 p Supersedes USAFETAC/DS-79/025
(AD-A118462; AD-E850201; USAFETAC/DS-82/042; USAFETAC/DS-79/025) Avail: NTIS HC A20/MF A01 CSCL 04/2

This report is a six-part statistical summary of surface weather observations for Fort Knox/Godman AAF, Kentucky. It contains the following parts: (A) Weather conditions; Atmospheric phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperature and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12778# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
CLIMATIC PROBABILITIES OF THE VERTICAL DISTRIBUTION OF CLOUD COVER Interim Scientific Report
Irving I. Gringorten 24 Feb. 1982 50 p refs
(AF Proj. 6670)
(AD-A118753; AFGL-TR-82-0078; AFGL-ERP-773) Avail: NTIS HC A03/MF A01 CSCL 04/2

The probability model of areal coverage of weather conditions that was published in the Journal of Applied Meteorology (1979) is applied to extend the usefulness of climatic records of station sky cover (tenths) and ceiling height (meters) to the estimation of cloud presence at any level in the atmosphere or within any layer. Specifically, estimates are made of: (a) the average cloud cover as a function of the vertical distance above the ground, (b) the average amount of cloud presence, in layers or at individual levels, and (c) the probability distribution of cloud cover, from clear to overcast, at any level or in any layer between two levels.
Author (GRA)

N83-12779# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
IMPROVED CLOUD DETECTION UTILIZING DEFENSE METEOROLOGICAL SATELLITE PROGRAM NEAR INFRARED MEASUREMENTS Interim Scientific Report
James T. Bunting and Robert P. DEntremont 27 Jan. 1982 93 p refs
(AF Proj. 6670)
(AD-A118751; AFGL-TR-82-0027; AFGL-ERP-765) Avail: NTIS HC A05/MF A01 CSCL 04/2

Six different automated classifiers, three of which were suggested by previous studies, were tested on a special data base of DMSP SSC (near IR channel, 1.51 to 1.63 micrometers) and OLS (visible channel, 0.4 to 1.0 micrometers, and IR channel, 10.2 to 12.8 micrometers). The classifiers were used to distinguish water clouds, ice clouds, snow cover, and other cloud-free surfaces. A test sample of 433 known cases was found with the aid of the AFGL Man-Computer Interactive Data Access System.
Author (GRA)

N83-12780# Air Force Environmental Technical Applications Center, Scott AFB, Ill. Data Processing Div.
REVISED UNIFORM SUMMARY OF SURFACE WEATHER OB-

SERVATIONS (RUSSWO). WURTSMITH AFB, MICH., PARTS A-F Final Report
17 Jun. 1982 486 p Supersedes USAFETAC/DS-78-010
(AD-A118510; AD-E850196; USAFETAC/DS-82/037; USAFETAC/DS-78/010) Avail: NTIS HC A21/MF A01 CSCL 04/2

This report is a six-part statistical summary of surface weather observations for Wurtsmith AFB, Michigan. It contains the following parts: (A) Weather conditions; Atmospheric Phenomena; (B) Precipitation, Snowfall and Snow Depth (daily amounts and extreme values); (C) Surface winds; (D) Ceiling versus Visibility; Sky Cover; (E) Psychrometric Summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and (F) Pressure Summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure). Data in this report are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. GRA

N83-12781# Systems and Applied Sciences Corp., Riverdale, Md.
TECHNIQUE DEVELOPMENT FOR WEATHER FORECASTING Final Report, 1 Dec. 1980 - 30 Nov. 1981
Alan M. Gerlach, ed. 30 Nov. 1981 190 p refs
(Contract F19628-81-C-0039; AF Proj. 6670)
(AD-A118744; AFGL-TR-82-0020) Avail: NTIS HC A09/MF A01 CSCL 04/2

This report summarizes weather research conducted by SASC in several technical areas: in numerical weather prediction, investigation of the physical and spectral characteristics of global moisture, distribution, and examination of the generation of harmonics for analysis of meteorological data in the vertical and horizontal; development of McIDAS-based interactive aids for formulating mesoscale forecasts; development of specialized computer programs for sensor and technique evaluation; in satellite meteorology, interactive adaptation of a clustering technique for image analysis, and test of curves relating cloud over and average reflectivity; in weather radar, development of a single-Doppler with retrieval technique, real-time conversion of a storm cell detection and tracking technique, and studies of turbulence structures. In addition, the maintenance, enhancement, and use of McIDAS are described. Author (GRA)

N83-12782# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorolgy Div.
THE B-G SYSTEM OF EVALUATING FORECASTS Interim Scientific Report
Irving I. Gringorten and Albert R. Boehm 4 Jan. 1982 33 p
(AF Proj. 6670)
(AD-A118735; AFGL-TR-82-0006; AFGL-ERP-761) Avail: NTIS HC A03/MF A01 CSCL 04/2

To score a forecast of an event, like the noontime temperature at a city airport, a system has been proposed that would measure the improvement of the forecast over simple climatic information. If the climatic probability of the forecast (F) is PF, and that of the observed event (V) is PV, then the assigned score (sFV) becomes sFV = -ln(1 - P1)P2 - 1, where P1 = min(PF, PV) and P2 = max(PF, PV). A test of the forecaster's skill, however, requires a large set of forecasts and corresponding verifications. GRA

N83-12783# Air Force Geophysics Lab., Hanscom AFB, Mass. Meteorology Div.
CIRRUS PARTICLE DISTRIBUTION STUDY, PART 8 Final Scientific Report
Ian D. Cohen 28 Oct. 1981 107 p refs
(AF Proj. 2310)
(AD-A118715; AFGL-TR-81-0316-Pt-8; AFGL-AFSG-437-Pt-8) Avail: NTIS HC A06/MF A01 CSCL 04/2

The AFGL instrumented MC-130E sampled thin cirrus clouds on 3,4, and 5 February 1979. In some cases, there was no visible cirrus, but some particles were detected. During this period, the upper air pattern was dominated by southwest to northeast flow, while two surface systems moved from north to south. The first of these left thin cirrus in eastern New Mexico; the second pushed south to the Gulf of Mexico, leaving the cirrus studied on the previous two flights. Most of the particles observed were less than 100 microns. As a rule, the opacity of the cirrus seemed related more closely to the density of particles in the 20- to 200-micro range. On examination the form factor appeared to be higher (indicating more consistent sized particles) in cirrus of nonfrontal origin than in cirrus associated with strong surface weather systems. This report is the last in a series of cirrus partic'e distribution studies. GRA

N83-12784# Science Applications, Inc., McLean, Va.
NUMERICAL MODELING OF TROPICAL WEATHER SYSTEMS Final Report, 13 Apr. 1981 - 12 Jun. 1982
Simon Chang Aug. 1982 47 p refs
(Contract N00014-81-C-2224)
(AD-A118836; SAI-83-895-WA) Avail: NTIS HC A03/MF A01 CSCL 04/2

This final report documents the efforts on numerical simulations of tropical weather systems. Tropical weather systems investigated include the Indian Ocean monsoon depressions, tropical cyclones, and easterly waves. GRA

N83-12785# Pacific Northwest Lab., Richland, Wash.
CANDIDATE WIND-TURBINE-GENERATOR SITE: DATA SUMMARY Annual Report, Jan. - Dec. 1981
W. F. Sandusky, J. W. Buck, D. S. Renne, D. L. Hadley, and O. B. Abbey Jul. 1982 298 p refs
(Contract DE-AC06-76RLO-1830)
(DE82-020416; PNL-4283) Avail: NTIS HC A13/MF A01

Summarized hourly meteorological data for 34 candidate and wind turbine generator sites for calendar year 1981 are pesented. These data are collected for the purpose of evaluating the wind energy potential at these sites and are used to assist in selection of potential sites for installation and testing of large wind turbines in electric utility systems. For each site, wind speed, direction, and distribution data are given in eight tables. Use of information from these tables, with information about specific wind turbines, should allow the user to estimate the potential for wind energy production at each site. DOE

N83-12786# Midwest Research Inst., Golden, Colo. Solar Electric Conversion Research Div.
BOUNDARY-LAYER MESOSCALE WIND ANALYSIS
Amir Mikhail Aug. 1982 24 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-020414; SERI/TR-215-1612) Avail: NTIS HC A02/MF A01

A wind mesoscale data network is described that was formed by data collected from the Prototype Regional Observing Forecasting network, established by the National Oceanic and Atmospheric Administration (NOAA). The data network includes other sources as well, such as the National Climatic Center and the NOAA meteorological tower in Erie, Colorado. A methodology for analyzing the mesoscale variability of the wind resource is suggested. The analysis is based on mesoscale parameters that influence the transfer of momentum in the surface layer. The parameters discussed are site elevation, distance from the coast, angular horizon, surface roughness length, thermal stability, shape, and geostrophic wind. Various methods of evaluting these parameters are detailed. The contribution of the parameters to mesoscale wind variability is analyzed. DOE

N83-12787# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
JULY 1982 ENVIRONMENTAL DATA FOR SITES IN THE NATIONAL SOLAR DATA NETWORK
Jul. 1982 98 p refs Sponsored in part by ANL
(Contract DE-AC01-79CS-30027)
(DE82-021702; SOLAR/0010-82/07) Avail: NTIS

HC A05/MF A01

Environmental data were collected at the sites of the national solar data network and tabulated for each solar site. The sites are grouped into 23 zones, each of which consists of several adjacent states. The insolation table presents the total, diffuse, direct, maximum, and extraterrestrial radiation for the solar site. The ratio of the total is extraterrestrial radiation as a percent is shown. The temperature table gives the average, daytime, nighttime, maximum, minimum and inlet water temperatures for the solar site. All of the passive and some of the active solar sites are equipped with wind sensors which provide information for two wind tables furnishing wind speed and direction. For some sites, a humidity table provides relative humidity values for day and night. Values for the maximum and minimum humidity for each day are also given. DOE

N83-12788# Otawa (Toru), Municie, Ind.

DEVELOPMENT OF A SLIDE PROGRAM DESCRIBING A SITE SELECTION PROCESS FOR SMALL WIND-ENERGY-CONVERSION SYSTEMS (SWECS) Final Technical Report

Toru Otawa May 1982 79 p refs

(Grant DE-FG02-81R-510301)

(DE82-017394; DOE/R5-10301/1-FINAL) Avail: NTIS HC A05/MF A01

A slide program was developed primarily to promote a proper site-selection method for small wind energy conversion systems (SWECS). The technical background of the program development is discussed. The major issues involved in SWECS siting are: wind-resource assessment techniques, land-use constraints, potential hazards, potential environmental impact, site accessibility, and proximity to load location. These factors are incorporated into a method of site-screening to maximize energy output as well as to discourage the negative impact of SWECS siting on the environment. The method utilizes the technique of overlay mapping to analyze different relationships among various patterns of land characteristics. Transparent or semi-transparent maps depicting the patterns are overlaid to show a pattern of light and dark tones revealing areas of site potentials and limitations for SWECS placement. A case-study is conducted to demonstrate the site-selection method developed. DOE

N83-12789# World Meteorological Organization, Geneva (Switzerland).

FIRST PLANNING MEETING FOR THE TYPHOON OPERATIONAL EXPERIMENT (TOPEX) World Weather Watch Tropical Cyclone Programme

1980 77 p refs Conf. held at Tokyo, 17-26 Jun. 1980

(WMO-565; TOPEX-1; ISBN-92-63-10565-0) Avail: NTIS MF A01; print copy available at WMO, Geneva

The observational, data processing and telecommunications requirements for the meteorological component of the experiment were defined. Facilities in selected river basins were evaluated for the hydrological component of TOPEX. Objectives for warning dissemination and information exchange were discussed and means suggested for coordination of the experiment. Responsibilities for exchanges of observational data and processed materials were assigned, and data formats provided. A model typhoon was selected for simulations and experiment rehearsals. Author (ESA)

N83-12790# World Meteorological Organization, Geneva (Switzerland).

MANUAL ON STREAM GAUGING. VOLUME 1: FIELDWORK

1980 323 p refs 2 Vol.

(WMO-519-Vol-1; OHR-13-Vol-1; ISBN-92-63-10519-7) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 52

Procedures are described for the hydrological technician for selecting gaging station sites, network design and the hydraulic considerations entering into site selection. The types of gaging station controls and the attributes of a satisfactory control and artificial controls are presented. Measurement of stage, measurement of discharge by current meter methods, use of moving boat, ultrasonic and electromagnetic methods are described. Discharge measurement by various methods and determination of peak discharge are covered. Author (ESA)

N83-12791# World Meteorological Organization, Geneva (Switzerland).

MANUAL ON STREAM GAUGING. VOLUME 2: COMPUTATION OF DISCHARGE

1980 273 p refs 2 Vol.

(WMO-519-Vol-2; OHR-13-Vol-2; ISBN-92-63-10519-7) Avail: NTIS MF A01; print copy available at WMO, Geneva SwFr 52

Computation of the stage discharge relation and daily mean discharge are dealt with for the engineer having a background in basic hydraulics. Discharge ratings using simple stage discharge relations, discharge ratings using slope as a parameter and discharge ratings for tidal streams are presented. The establishment of discharge ratings for dams, locks and storm drains is discussed. Station analysis and computation of discharge records are discussed. Author (ESA)

N83-12792# World Meteorological Organization, Geneva (Switzerland).

CLIMATIC CHANGES AND THEIR EFFECTS ON THE BIOSPHERE. THE FOURTH IMO LECTURE

B. Bolin 1980 59 p refs Presented at 8th WMO Congr., Geneva, 30 Apr. - 25 May 1979

(WMO-542; ISBN-92-63-10542-1) Avail: NTIS MF A01; print copy available at WMO, Geneva

The key features of climatic changes during post-glacial times are described and particularly the way the vegetation zones were changed and modified due to such climatic changes. The change in organic matter on land during the last 20,000 years is assessed and compared with man-induced changes in the carbon cycle. It is shown that modest changes of the climate affect existing biomes significantly and may also have serious implications for man. Author (ESA)

N83-12793# World Meteorological Organization, Geneva (Switzerland).

WEATHER AND AIRBORNE ORGANISMS

D. E. Pedgley 1980 103 p refs

(WMO-562; TN-173; ISBN-92-63-10562-6) Avail: NTIS MF A01; print copy available at WMO, Geneva

Meteorological aspects of aerobiology are discussed for use in aerobiological research projects and in operational activities. The background information required to understand the take-off, displacement, dispersion and landing of airborne organisms is given. Reviews from literature were included to show the many kinds of organisms, scales of effect and kinds of observing and analysis techniques used. It is concluded that apart from a few very harmful species little or nothing is known about the sources and sinks of pest and disease organisms on a scale needed for forecasting and backtracking windborne spread. Author (ESA)

N83-12794# World Meteorological Organization, Geneva (Switzerland).

FIRST GARP GLOBAL EXPERIMENT OPERATIONS REPORT SERIES. VOLUME 1: OBSERVING SYSTEM OPERATIONS, 1 DECEMBER 1978 - 30 JUNE 1979

Jun. 1980 86 p refs Prepared in cooperation with ICSU, Rome (GARP-FOR-1) Avail: NTIS MF A01; print copy available at WMO, Geneva

The implementation of the composite observing system in the operational year is described and a preliminary evaluation of the operations conducted is provided. The operations are summarized on a system-by-system basis, including the satellite systems, synoptic and upper air surface based networks, tropical wind observing ships, aircraft dropwindsonde system, tropical constant level balloon system and aircraft flight level data systems. Author (ESA)

N83-12795# World Meteorological Organization, Geneva (Switzerland).

WORLD WEATHER WATCH TROPICAL CYCLONE PRO-

GRAMME. TYPHOON OPERATIONAL EXPERIMENT: A GENERAL DESCRIPTION
1981 56 p refs
(WMO-573; Topex-3; ISBN-92-63-10573-1) Avail: NTIS MF A01; print copy available at WMO, Geneva

A multinational experiment to follow actual typhoons through all stages of detection and tracking is described. In order to reduce loss of life and damage from typhoon wind, flood, and storm surge, an intensified network of observations of the typhoon is planned with real-time integrated analysis, forecasting, and warning. The subexperiment covers details of the three-dimensional structure of the typhoon, its mechanism of generation, development, and decay. Specific national activities are planned. The area and period covered and the timetable for the experiment are given, and the planning for the meteorological, hydrological, and warning dissemination and information exchange components are detailed.
Author (ESA)

N83-12796# World Meteorological Organization, Geneva (Switzerland). International MONEX Management Centre (Summer).
FGGE - THE GLOBAL WEATHER EXPERIMENT. FIRST GARP GLOBAL EXPERIMENT OPERATIONS REPORT SERIES. VOLUME 8: SUMMER MONEX FIELD PHASE REPORT
Apr. 1981 398 p refs Prepared in cooperation with ICSU, Rome
(GARP-FOR-8) Avail: NTIS MF A01; print copy available at WMO, Geneva

The investigation of the dynamic and thermodynamic structure of the Asian Monsoon of the Northern Hemisphere summer of 1979 is reported. Investigations of the heat balance, energetics and kinetics of the circulation are included. Investigations cover two scales of motion, planetary and synoptic. Specific associated phenomena, such as the Arabian Sea mid-tropospheric cyclone, Somali low-level jet and Bay of Bengal disturbances, are highlighted. Profiles of the radiation balance over the Middle East and studies of the Inter-Tropical Convergence Zone over the Equator were made for the first time. Use was made of the geostationary satellites METEOSAT, GOES (Indian Ocean), and GMS, and the orbiting satellites TIROS-N, DMSP, and METEOR. Ship and land stations, meteorological research aircraft, and specialized observing systems were used for surface-based observations, as well as conventional radar systems, standard oceanographic measurements, drifting buoys and existing networks of hydrological, agrometeorological and radiation measurements. Author (ESA)

N83-12797# World Meteorological Organization, Geneva (Switzerland).
SELECTION OF DISTRIBUTION TYPES FOR EXTREMES OF PRECIPITATION
B. Sevruk and H. Geiger 1981 72 p refs
(WMO-560; OHR-15; ISBN-92-63-10560-X) Avail: NTIS MF A01; print copy available at WMO, Geneva

The effect of climate, seasonal and geographical pattern, and duration of precipitation on the selection of distribution types for analyzing precipitation is covered. An example of the computation of extremes of precipitation using the first and second extremal distributions is reproduced. A record of 40 to 50 years is thought to be reliable, but general humidity should be taken into account when deciding. Author (ESA)

N83-12798# World Meteorological Organization, Geneva (Switzerland).
SCIENTIFIC RESULTS OF THE AIR MASS TRANSFORMATION EXPERIMENT (AMTEX) Global Atmospheric Research Programme
Mar. 1981 254 p refs Prepared in cooperation with ICSU, Rome
(GARP-Publ-Ser-24) Avail: NTIS MF A01; print copy available at WMO, Geneva

The two experiments carried out around the Southwest Islands of Japan are reported, and synoptic situations are explained. Outbursts of cold air from China and mixed layers which developed over the ocean were observed. The energy budget at the sea surface, and the air-mass transformation in the planetary boundary layer are analyzed. Observational studies of clouds and precipitation are presented. The features of large scale circulation and the dynamical structures of medium scale disturbances are discussed. The model experiment of formation and maintenance of a moist mixed layer over the AMTEX area is described.
Author (ESA)

N83-12799# World Meteorological Organization, Geneva (Switzerland).
WORLD WEATHER WATCH. OVERALL REPORT ON THE VOLUNTARY COOPERATION PROGRAM, NOTABLY ON PROJECTS APPROVED FOR TRANSMISSION TO MEMBERS OF THE WMO IN 1980 [VEILLE METEOROLOGIQUE MONDIALE. RAPPORT D'ENSEMBLE SUR LE PROGRAMME DE COOPERATION VOLONTAIRE, NOTAMMENT SUR LES PROJETS APPROUVES POUR COMMUNICATION AUX MEMBRES DE L'OMM EN 1980]
Jan. 1981 311 p In FRENCH
(OMM-571; ISBN-92-63-20571-X) Avail: NTIS MF A01; print copy available at WMO, Geneva

International cooperation in World Meteorological Organization projects is reported. Topics include: (1) overview of the program up to 31 Dec. 1980; (2) rules governing projects, as ammended by the executive committee in 1980; (3) funding regulations; (4) equipment; (5) projects approved in 1980; and (6) projects completed or revised. Author (ESA)

N83-12800# World Meteorological Organization, Geneva (Switzerland).
BASIC SYNOPTIC NETWORKS OF OBSERVING STATIONS
1981 513 p In ENGLISH and FRENCH
(WMO-217) Avail: NTIS MF A01; print copy available at WMO, Geneva

The state of implementation of synoptic networks in each of the World Meteorological Organization regions plus Antartica is reviewed. Observing stations not in operation and stations carrying out an incomplete program are listed in order to express the level of implementation as a percentage of the total number of basic network observations requested. Stations, programs, deficiencies, and plans are detailed for each country. A set of network maps, showing stations from which observations are requested and those which are implemented, is provided. The set consists of one surface and one upper air chart for 00 and 12 Greenwich mean time.
Author (ESA)

N83-12801# World Meteorological Organization, Geneva (Switzerland).
MANUAL ON THE GLOBAL OBSERVING SYSTEM. VOLUME 1 (ANNEX TO THE WMO TECHNICAL REGULATIONS): GLOBAL ASPECTS, 1981 EDITION
1981 111 p
(WMO-544-Vol-1-Annex; ISBN-92-63-12544-9) Avail: NTIS MF A01; print copy available at WMO, Geneva

Technical regulations (standard or recommended practices and procedures) for the guidance of global observing system members are given. Surface and space based systems are covered. Observational requirements, requirements for horizontal spacing, reporting frequency, and reduction of level 1 data are treated. The values of physical functions and constants, barometer conventions and calculation procedures are presented. Quality control procedures are outlined. Author (ESA)

N83-12802# World Meteorological Organization, Geneva (Switzerland).
WORLD INTEGRATED OCEANIC SERVICES SYSTEM: GENERAL PLAN AND OPERATIONAL PROGRAM FOR 1982-1985 [SYSTEME MONDIAL INTEGRE DE SERVICES OCEANIQUES: PLAN GENERAL ET PROGRAMME DE MISE EN OEUVRE POUR 1982-1985]
Jan. 1982 49 p In FRENCH Prepared in cooperation with UNESCO's Commission Oceanographique Intergouvernementale
(WMO-582; ISBN-92-63-20582-5) Avail: NTIS MF A01; print copy

available at WMO, Geneva

General principles as to the observation and study of the ocean and atmosphere, emphasizing their interaction, are outlined. The World Integrated Oceanic Services System (WIOSS) meets these requirements. The WIOSS observation system as well as the data processing and analysis system are described. Measures taken relative to telecommunications and the dissemination of WIOSS information are reported. Other activities related to WIOSS (training, R and D, operations management) are also mentioned.

Author (ESA)

N83-12803# World Meteorological Organization, Geneva (Switzerland).

COMMISSION FOR MARINE TECHNOLOGY: ABRIDGED REPORT OF THE 8TH SESSION Final Report

1981 126 p Presented at Hamburg, 14-25 Sep. 1981

(WMO-584; ISBN-92-63-10584-7) Avail: NTIS MF A01; print copy available at WMO, Geneva

Marine meteorology, maritime navigation, and ocean exploration and exploitation are considered, stressing application of meteorology and international cooperation. Prediction and early warning of hazardous weather conditions and associated floods are discussed, particularly in respect to observing activities over the ocean, marine data collection, marine climatology and sea ice. The economic impact of marine meteorological information, e.g. ship weather routing, is pointed out. The need for rational use of ocean resources and environmental protection is mentioned. Tasks of the Commission are to contribute substantially to the World Weather Watch and the World Climate Program and to provide ocean data for medium-range and long-range weather forecasting and research. Author (ESA)

N83-12804# World Meteorological Organization, Geneva (Switzerland).

REPORT OF THE SECOND SESSION OF THE INTERGOVERNMENTAL PLANNING MEETING ON ALPEX

1981 65 p refs Conf. held at Geneva, Nov. 1981 Prepared in cooperation with ICSU, Rome

(GARP-Spec-Rept-39) Avail: NTIS MF A01; print copy available at WMO, Geneva

The Alpex satellite program, operations center plans, upper air station distribution, microbarograph program, aircraft program, radar program, oceanographic program, and data management were discussed. Rapid scan Meteosat data are to be used for high resolution wind analyses. Digital data and photographs are archived by ESA. A substantial increase in space and time density of upper air observations is planned. Author (ESA)

N83-12805# World Meteorological Organization, Geneva (Switzerland).

REGIONAL ASSOCIATION 4 (NORTH AND CENTRAL AMERICA). ABRIDGED REPORT OF THE EIGHTH SESSION Final Report

1982 159 p refs Conf. held at Havana, 23 Nov. - 2 Dec. 1981

(WMO-586; ISBN-92-63-10586-3) Avail: NTIS MF A01; print copy available at WMO, Geneva

Programs of the World Meteorological Organization were reported on and meteorological sevices were discussed. Topics cover the World Weather Watch program, atmospheric research and the Global Atmospheric Research Program, and the Meteorological Applications and Environment Program. The Hydrology and Water Resources Program, the World Climate Program, and various technical cooperation projects are also dealt with. Author (ESA)

N83-12806# World Meteorological Organization, Geneva (Switzerland).

THE GLOBAL WEATHER EXPERIMENT. FIRST GARP GLOBAL EXPERIMENT (FGGE) OPERATIONS REPORT SERIES: VOLUME 3, SUMMARY OF DATA COLLECTED 27 NOV. 1978 - 6 MAR. 1979 Global Atmospheric Research Programme (GARP)

Oct. 1981 306 p refs Prepared in cooperation with ICSU, Rome

(GARP-FOR-3) Avail: NTIS MF A01; print copy available at WMO, Geneva

Information on the volume of data collected during the FGGE is presented. The frequency and the geographical distribution of observations is given in two different ways. In map form, utilizing the gray-shading technique, the daily average number of each type of observation is shown for the whole globe from 80 deg S to 80 deg N and for the polar regions. In order to provide in more detail the distribution of the observations, the tables present the daily average number of observations for each 5 deg latitude by 5 deg longitude area. The gray-shaded maps illustrate roughly the global distribution of observations. Before drawing the isolines, the daily average number of observations was computed over a unit area of 1000 km by 1000 km centered in the middle of each 5 deg latitude by 5 deg longitude area on the globe. One result of this technique is that ocean-based observations from areas near the coastlines have an impact on the data coverage over adjacent continents and vice versa. Author (ESA)

N83-12807# World Meteorological Organization, Geneva (Switzerland).

THE GLOBAL WEATHER EXPERIMENT. FIRST GARP GLOBAL EXPERIMENT (FGGE) OPERATIONS REPORT SERIES: VOLUME 4, SUMMARY OF DATA COLLECTED 7 MAR. - 4 JUL. 1979 Global Atmospheric Research Programme

Oct. 1981 344 p refs Prepared in cooperation with ICSU, Rome

(GARP-FOR-4) Avail: NTIS MF A01; print copy available at WMO Geneva

Information on the volume of data collected during the FGGE is presented. The frequency and the geographical distribution of observations is given in two different ways. The gray-shading technique is used on maps to show the daily average number of each type of observation for the whole globe from 80 deg S to 80 deg N and for the polar regions. In order to provide in more detail the distributions of the observations, tables present the daily average number of observations for each 5 deg latitude by 5 longitude area. The gray-shaded maps illustrate roughly the global distribution of observations. Before drawing the isolines, the daily average number of observations was computed over a unit area of 1000 km by 1000 km centered in the middle of each 5 deg latitude by 5 deg longitude area on the globe. One result of this technique is that ocean-based observations from areas near the coastlines have an impact on the data coverage over adjacent continents and vice versa. Author (ESA)

N83-12808# World Meteorological Organization, Geneva (Switzerland).

THE GLOBAL WEATHER EXPERIMENT. FIRST GARP GLOBAL EXPERIMENT (FGGE) OPERATIONS REPORT SERIES: VOLUME 5, SUMMARY OF DATA COLLECTED 5 JULY - DECEMBER 1979 Global Atmospheric Research Program

Oct. 1981 104 p refs Prepared in cooperation with ICSU, Rome

(GARP-FOR-5) Avail: NTIS MF A01; print copy available at WMO, Geneva

Information on the volume of data collected during the FGGE is presented. The frequency and the geographical distribution of observations is presented in two different ways. In map form, utilizing the gray-shading technique, the daily average number of each type of observation is shown for the whole globe from 80 deg S to 80 deg N and for the polar regions. In order to provide in more detail the distribution of the observations, the tables present the daily average number of observations for each 5 deg latitude by 5 deg longitude area. The gray-shaded maps illustrate roughly the global distribution of observations. Before drawing the isolines, the daily average number of observations was computed over a unit area of 1000 km by 1000 km centered in the middle of each 5 deg latitude by 5 deg longitude area on the globe. One result of this technique is that ocean-based observations from areas near the coastlines have an impact on the data coverage over adjacent continents and vice versa. Author (ESA)

N83-12809# World Meteorological Organization, Geneva (Switzerland).
METHODS OF CORRECTION FOR SYSTEMATIC ERROR IN POINT PRECIPITATION MEASUREMENT FOR OPERATIONAL USE
B. Sevruk 1982 106 p refs
(WMO-589; OHR-21; ISBN-92-63-10589-8) Avail: NTIS MF A01; print copy available at WMO, Geneva

Guidance on methods of correcting for systematic errors in precipitation measurement (caused, e.g. by wind, splashing, wetting, evaporation or blown snow), using diagrams, formulas, and examples from countries where these corrections are employed, is given. The general correction model is : corrected amount of precipitation = k PC = k (Pg + Delta P1 + Delta P2 + Delta P3 + or - Delta P4 Delta P5) + or - Delta Pr, where k = conservation factor due to wind field deformation, PC = amount of precipitation caught by the gage, Pg = amount of precipitation measured in the gage, Delta P1 + Delta P2 = losses from wetting on internal walls of collector and in the container when it is emptied, Delta P3 = evaporation loss from container, Delta P4 = splash out and splash in, Delta P5 = blown and drifting snow, and Delta Pr = random observational and instrument errors. Factor k and Delta P1 to Delta P5 for a particular gage can be estimated by field comparisons or by laboratory tests. Meteorological factors can be estimated using standard meteorological obserbations at the gage site or in its vicinity. Author (ESA)

N83-12810*# World Meteorological Organization, Geneva (Switzerland).
COMPENDIUM OF TRAINING FACILITIES FOR METEOROLOGY AND OPERATIONAL HYDROLOGY
1982 599 p refs Revised
(WMO-240-Rev; ISBN-92-63-16240-9) Avail: NTIS MF A01; print copy available at WMO, Geneva

Information is provided on training courses available in about 96 countries in applied meteorology (including agrometeorology, air pollution meteorology, cloud physics, weather modification, and satellite meteorology) and hydrology. The location is given as well as the nature and language of instruction. Course duration, starting dates, entrance qualifications, and tuition fees are listed. A condensed syllabus is provided. Information on accomodation, and the number of students admitted to the courses is included. Author (ESA)

N83-12811# World Meteorological Organization, Geneva (Switzerland).
[ACTIVITIES OF THE WMO] Annual Report, 1981
1982 228 p refs
(WMO-592; ISSN-92-63-10592-8) Avail: NTIS MF A01; print copy available at WMO, Geneva

Activities of World Weather Watch, the meteorological applications and environment program, GARP, the world climate program, and the hydrology, water resources, education, and technical cooperation programs are described. External relations and legal matters are discussed. Author (ESA)

N83-12812# National Center for Atmospheric Research, Boulder, Colo.
DOCUMENTATION FOR THE COMMUNITY CLIMATE MODEL (CCM) VERSION O
Warren M. Washington, ed. Jan. 1982 346 p refs
(Grant NSF ATM-77-23757)
(PB82-194192; NCAR-0306-82-1) Avail: NTIS HC A15/MF A01 CSCL 04B

The National Center for Atmospheric Research community climate model is described along with its code structure, operating instructions, processors, files, and programs for gridpoint history volumes. GRA

N83-12813# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Lab.
GEOPHYSICAL MONITORING FOR CLIMATIC CHANGE NO. 9 Summary Report, Dec. 1981
John J. DeLuisi, ed. Dec. 1981 174 p refs
(PB82-193061; SR-9) Avail: NTIS HC A08/MF A01 CSCL 04B

Research operations and accomplishments by the Geophysical Monitoring for Climatic Change program are reviewed. Topics include atmospheric CO2, ozone, water vapor, aerosols, solar radiation, halocarbons, and precipitation chemistry. M.G.

N83-12814# Research Triangle Inst., Research Triangle Park, N.C.
ESTIMATING CLOUD PARAMETERS FOR NEROS I
F. Vukovich and D. Erlich Mar. 1982 28 p
(Contract EPA-68-02-3428)
(PB82-186552; EPA-600/3-82-011) Avail: NTIS HC A03/MF A01 CSCL 04B

GOES infrared and visible imagery were combined with surface and upper-air meteorological observations to determine cloud amounts and cloud-top heights over the NEROS grid for the periods 1200, 1500, and 1800 EDT, on 3, 4, and 13 August 1979. Cloud amounts were determined for cumulus clouds alone and for all clouds. Cloud-top heights were determined specifically for cumulus clouds. A study was initiated to develop a model which may be used to parameterize the cloud ozone flux. Several models were developed to estimate the average maximum cloud vertical velocity. The best model developed was a multiple linear regression model. The model input parameters were the cloud-top height and the cloud amount, which were derived from satellite imagery. On the average, there was a 24-percent error in the estimated average cloud vertical velocity using the multiple linear regression model. However, it should be noted that the modeling results were not statistically significant because of the limited data available for development of the model (9 total data points, though only 7 were useful). Author (GRA)

N83-12815# National Oceanic and Atmospheric Administration, Boulder, Colo.
RADAR APPLICATIONS IN CLOUD AND CLEAR-AIR STUDIES
Earl E. Gossard and Richard G. Strauch Nov. 1981 276 p refs
(PB82-192592; NOAA-82022204; NOAA-TM-ERL-WPL-87) Avail: NTIS HC A13/MF A01 CSCL 04B

Following a review and discussion on radar returns from hydrometeors and clear-air radar returns, separate chapters are devoted to: physical effects of the atmosphere on radar waves; various radars and their potential for cloud and air detection; radar reflectivity and cloud characteristics; radar attenuation and cloud observation; polarization and scatterer characterization; Doppler radar observation of clouds and clear-air; biological targets and their role in radar backscatter; boundary layer structure and radar refraction, ducting and scattering; and boundary layers undergoing modification. Author (GRA)

N83-12816# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-2 DATA REDUCTIONS AND ANALYSES (PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS). PART 3: S- AND C-BAND RADAR OBSERVATIONS IN SUPPORT OF FACE-2
Raul E. Lopez, David O. Blanchard, Daniel Rosenfeld, Marjorie J. Casey, and William L. Hiscox Oct. 1981 327 p refs
(PB82-183179; NOAA-TM-ERL-OWRM-7-Pt-3;
NOAA-81122908-Pt-3) Avail: NTIS HC A15/MF A01 CSCL 04B

The two radar systems used in FACE-2 (WSR-57 and MPS-4) are described, together with the data acquisition procedures that were employed in the experiment and the schemes that were developed to process and analyze the raw data collected. Then, a data catalog and a list of the principal parameters used to process the data for each day are presented. GRA

N83-12817# Lightning Location and Protection, Inc., Tucson, Ariz.
FACE-2 DATA REDUCTIONS AND ANALYSES (PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS). PART 6: CLOUD-TO-GROUND LIGHTNING DATA FOR FACE-2
Michael W. Maier and Ronald L. Holle (NOAA, Boulder, Colo.) Oct. 1981 45 p refs

(PB82-183187; NOAA-TM-ERL-OWRM-10-Pt-6; NOAA-81122905-Pt-6) Avail: NTIS HC A03/MF A01 CSCL 04B

Lightning location data were obtained on 30 GO days (26 were B and 4 were A days) of the 61 GO days during Florida Area Cumulus Experiment-2 (FACE-2) for use in an exploratory analysis to determine if the treatment during FACE-2 resulted in any changes in the number and rate of cloud-to-ground lightning within the total and floating targets. It is estimated that 80% of the ground flashes within the target area were detected and located within 2 to 8 km. The total and floating target lightning data were reduced prior to disclosure of the treatment decision, minimizing the possibility of reduction bias. GRA

N83-12818# National Weather Service, Silver Spring, Md.
THE DISASTROUS SOUTHERN CALIFORNIA AND CENTRAL ARIZONA FLOODS, FLASH FLOODS, AND MUDSLIDES OF FEBRUARY 1980. A REPORT TO THE ADMINISTRATOR Natural Disaster Survey Report
Mar. 1981 134 p refs
(PB82-185406; NDSR-NWS-81-1; NOAA-82020502) Avail: NTIS HC A07/MF A01 CSCL 04B

A series of heavy rainstorms producing flash floods and widespread flooding in many areas of Southern California and Central Arizona from February 13 through 21, 1980 are discussed. Southern California also was plagued by mudslides caused by the persistent heavy rains. A disaster survey team, formed on February 21, visited the affected areas during the week of February 24 to review the NOAA Weather and Flood Warning System. The effectiveness of the NOAA System is reviewed and improvements for the future are sought. GRA

N83-12819# Bureau of Reclamation, Denver, Colo.
PROJECT SKYWATER DATA INVENTORY: 1980 - 1981 SCPP SEASON, SIERRA COOPERATIVE PILOT PROJECT
Jul. 1981 106 p
(PB82-185174) Avail: NTIS HC A06/MF A01 CSCL 04B

An inventory of all data collected from October 15, 1980 through April 1981 in association with the Sierra Cooperative Pilot Project is given. A weather modification research project in winter orographic cloud seeding is described. GRA

N83-12820# National Oceanic and Atmospheric Administration, Boulder, Colo. Weather Modification Program Office.
ON THE DETERMINATION OF PRECIPITATION EFFICIENCY
Herbert Riehl and Gary Williams Nov. 1981 35 p refs
(PB82-184938; NOAA-TM-ERL-WMPO-46; NOAA-82012901) Avail: NTIS HC A03/MF A01 CSCL 04B

A method which follows an air column across a mountain range, and a convergence zone to determine precipitation efficiency is outlined. The efficiency of this zone for releasing water or ice toward the ground is computed from the ratio of the difference in specific humidity at the inflow and outflow and at the greatest boundary to the difference in specific humidity at the inflow and at the greatest height, or lowest pressure, attained by the column. This method was applied to storms crossing the Wasatch Mountains of southern Utah for January to March 1981. Efficiency near 100% was determined and nearly 60% of the imported moisture was left over the mountains in these efficient cases. The two controls of the total precipitate, moisture difference between inflow and outflow, and strength of the total mass flow, contributed equally to the fallout. It is found that most of the trajectories followed across the mountain area are on the cyclonic shear side of jet streams. GRA

N83-12821# Pennsylvania State Univ., University Park. Dept. of Meteorology.
STATISTICAL MODELING OF THE INFRARED FLUX AND ALBEDO BASED ON A FOUR-YEAR SATELLITE ARCHIVE Final Report
John J. Cahir, Michael D. Fromm, Hans A. Panofsky, and Lanning M. Penn Oct. 1981 84 p refs
(Contract NOAA-04-6-158-44013)
(PB82-185315; NOAA-82021909) Avail: NTIS HC A05/MF A01 CSCL 04B

Radiation fluxes at the top of the atmosphere were estimated statistically as a function of conventional variables, such as humidity and temperature. The project began with daily estimates of infrared radiation in winter over the USA. Continental and oceanic samples were evaluated separately. The Planck function computed from an effective temperature is the dominant predictor. Between 60% and 72% of the variance of the albedo is explained; results over land again are superior. Overland patterns of year to year changes of visible and infrared fluxes are predicted well and are consistent with observed changes in rainfall and cloudiness. Over the oceans the skill for year to year changes is low. GRA

N83-12822# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FOCUSING MECHANISMS IN THE TEXAS FLASH FLOODS OF 1978
F. Caracena and J. M. Fritsch Nov. 1981 87 p refs
(PB82-185380; NOAA-TM-ERL-OWRM-12; NOAA-82021901) Avail: NTIS HC A05/MF A01 CSCL 04B

The meteorological conditions prior to devasting flash floods that occurred in the Hill Country of Texas and in the Big Country of Texas are documented. The mechanisms that focused and prolonged the rains in these areas are identified and an understanding of the transformation of tropical air masses as they move on shore in midlatitudes is enhanced. Guidance for forecasting flash floods associated with intrusions of deep tropical air into midlatitudes is provided. The role of tropical storm Amelia is analyzed. An upper air disturbance that moved from the Pacific Ocean into Mexico, and then into central Texas triggering the flash floods is discussed and several focusing mechanisms are described. GRA

N83-12823# National Weather Service, Silver Spring, Md. Office of Hydrology.
METEOROLOGY OF IMPORTANT RAINSTORMS IN THE COLORADO RIVER AND GREAT BASIN DRAINAGES
E. Marshall Hansen and Francis K. Schwarz Dec. 1981 183 p refs Sponsored in part by Corps. of Engineers
(PB82-185414; NOAA-NWS-HR-50; NOAA-82020401) Avail: NTIS HC A09/MF A01 CSCL 04B

Meteorological features of important general and local storms are discussed. Moisture climatology for the southern portion of the intermountain region is considered. GRA

N83-12824# Indian Inst. of Tropical Meteorology, Poona.
HARMONIC ANALYSIS OF NORMAL PENTAD RAINFALL OF INDIAN STATIONS
R. Ananthakrishnan Oct. 1981 38 p refs
(PB82-186875; ISSN-0252-1075) Avail: NTIS HC A03/MF A01 CSCL 04B

The space-time variations of Indian rainfall was studied using the harmonic analysis of the normal pentad rainfall data of 160 stations distributed over the country, including island stations in the Arabian Sea and the Bay of Bengal. Pentad rainfall diagrams of 18 selected stations and the numerical values of their harmonic components are also included. GRA

N83-12825# Indian Inst. of Tropical Meteorology, Poona.
PENTAD RAINFALL CHARTS AND SPACE-TIME VARIATIONS OF RAINFALL OVER INDIA AND THE ADJOINING AREAS
R. Ananthakrishnan and J. M. Pathan Nov. 1981 30 p refs
(PB82-187279; R-036; ISSN-0252-1075) Avail: NTIS HC A03/MF A01 CSCL 04B

Normal pentad rainfall charts for the 73 pentads of the year, for India and the adjoining areas are presented. The salient features of the space-time variations of the rainfall in the course of the year, brought out by the charts, are briefly discussed. GRA

N83-12826# National Oceanic and Atmospheric Administration, Washington, D. C. National Earth Satellite Service.
STATISTICAL AND SYNOPTIC EVALUATIONS OF TIROS-N AND NOAA-6 RETRIEVALS
Harold J. Brodrick, Carmella Watkins, and Arnold Gruber Oct.

1981 54 p refs
(PB82-188053; NOAA-TR-NESS-86; NOAA-82012904) Avail: NTIS HC A04/MF A01 CSCL 04B

TIROS N and NOAA 6 temperature retrievals are evaluated using statistical parameters and synoptic case studies. A period from September 1979 through April 1980 is examined with the use of the root mean square (RMS) and mean difference between matched pairs of radiosonde and satellite derived layer mean temperatures. The monthly samples are divided according to retrieval method (clear, partly cloudy, and cloudy), and topography type (land or sea). The principal results show that the largest RMS differences occur in the layers near the Earth's surface and in the tropopause region, with the clear retrievals giving the smallest RMS differences and cloudy retrievals producing the largest. GRA

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-12827# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RELATION BETWEEN OCEAN TEMPERATURE AND OCEAN LEVEL CHANGE IN THE TROPICAL ATLANTIC AND PRECIPITATION IN THE AMAZON REGION OF NORTHEAST BRAZIL [RELACOES ENTRE TEMPERATURA DA AGUA DO MAR E DIVERGENCIA AO NIVEL DO MAR NO ATLANTICO TROPICAL E PRECIPITACAO NAS REGIOES AMAZONICA E NORDESTE DO BRASIL]
Mary Toshie Kagano Sep. 1982 48 p refs In PORTUGUESE; ENGLISH summary
(INPE-2543-PRE/203) Avail: NTIS HC A03/MF A01

The precipitation series for the rainy season over northeastern Brazil (Fortaleza and Quixeramobim) and the Amazon Region (manaus, Belem, Taperinha, Conceicao do Araguaia and Alto Tapajos) and a 48 station average of normalized departure of annual precipitation in the Caribbean area are correlated with sea surface temperature and sea level wind divergence over the tropical Atlantic. The correlation for the Brazilian stations shows negative values over the North Atlantic and positive values over the South Atlantic. For the Caribbean area this pattern is approximately reversed. Convergence and divergence areas were found associated with anomalously warm and cold regions, respectively. The occurrence of droughts over northeastern Brazil is associated with the simultaneous existence of divergence and colder water over the South Atlantic and convergence and warmer water over North Atlantic. Wet year patterns are reversed. This suggests the appearance of an anomalous direct thermal meridional cell over tropical Atlantic, as suggested by Moura and Shukla to explain the dynamic mechanism associated with northeastern Brazil anomalous rainfall regimes. Author

N83-12828*# Washington Univ., Seattle. Dept. of Geography.
COMPARISON OF ENVIRONMENTAL CONDITIONS IN THE BERING SEA AND DAVIS STRAIT AND THE EFFECTS ON MICROWAVE SIGNATURE RETURNS; MARCH AND APRIL, 1979 Final Report
S. Lyn McNutt and Seelye Martin 15 Jun. 1982 95 p refs
(Contract NAG5-161)
(NASA-CR-169473; NAS 1.26:169473) Avail: NTIS HC A05/MF A01 CSCL 08J

Aircraft data collected in the Bering Sea in March, 1979 using a 6.6 GH sub z (C Band) microwave radiometer and a 13.9 GH sub z (Ku Band) scatterometer, reinforce the difficulties in interpreting first year ice types found near the ice edge in a marginal ice zone. An ice interpretation scheme using data taken with a 13.3 GH sub z (Ku Band) scatterometer and a 19.4 GH sub z (K Band) radiometer in Davis Strait also shows ambiguity in the first year ice signal and indicates that ice interpretation becomes more difficult near the ice edge and under warmer conditions. This report also compares X Band SAR data taken in Davis Strait with similar imagery collected in the Bering Sea. Ice core samples from the Bering test area offer a basis for speculation on changes in ice morphology which affect the signature return at the ice edge, and help explain the difficulty of the sensors in discerning the two different ice types found on the photography and in the core samples. Author

N83-12829*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OCEANOGRAPHIC APPLICATIONS OF THE KALMAN FILTER
R. W. Barbieri and P. S. Schopf Jul. 1982 26 p refs
(NASA-TM-83993; NAS 1.15:83993) Avail: NTIS HC A03/MF A01 CSCL 08C

The Kalman filter is a data-processing algorithm with a distinguished history in systems theory. Its application to oceanographic problems is in the embryo stage. The behavior of the filter is demonstrated in the context of an internal equatorial Rossby wave propagation problem. Author

N83-12830# Washington Univ., Seattle. Applied Physics Lab.
FEASIBILITY OF ACOUSTICALLY DETERMINING THE THICKNESS OF SEA ICE Final Report
Robert E. Bunney Apr. 1974 88 p refs
(Contract DAAG17-73-C-0028; ARPA Order 2096)
(AD-A118499; APL-UW-7317) Avail: NTIS HC A05/MF A01 CSCL 08/12

The principal objective of this investigation was to experimentally determine the feasibility of using acoustic pulse echo techniques to measure the thickness of sea ice. Field tests performed on both winter and annual sea ice showed that a pulse echo technique is entirely feasible if: (1) adequate coupling between the sound source and the ice surface is obtained, and (2) either the source levels are kept sufficiently high or the frequency is kept low enough that the wavelength of the sound is large compared to the size of the sound-scattering centers in the ice. Our measurements of the compressional and shear wave velocities parallel to the axis of the ice indicate that such thickness measurements can be accurate to within 1.5%. The tests indicated that the acoustic impedance mismatch at the icewater interface is sufficient to allow the use of either the compressional or the shear wave. Before the shear wave could be used, however, an efficient method would have to be found for establishing a reliable bond between the ice and the acoustic source. We did not obtain sufficient data to verify reports in the literature that seasonal variations in both the compressional and shear wave velocities approach 20%. GRA

N83-12831# Delaware Univ., Newark. Dept. of Civil Engineering.
WAVE SPECTRAL TRANSFORMATION IN SHALLOW WATER
Yun-Hai Chen and Hsiang Wang Jun. 1982 163 p refs
(Contract N00014-81-K-0297)
(AD-A118496; CE-82-23; TR-10) Avail: NTIS HC A08/MF A01 CSCL 08/3

The purpose of this study is to develop a numerical method to compute shallow water wave spectral transformation both for stationary and non-stationary cases. A numerical model for stationary wave spectral transformation has been developed by Shiau and Wang (1977) and further amplified by Wang and Yang (1981). The present work extends the model to add bottom friction and local wind generation. This model is applicable to wave spectral transformation under stationary meteorological conditions. If the meteorological condition is non-stationary in the generating area or the local wind effect in the domain of consideration can no longer be neglected, such as when a hurricane or storm sweeps through offshore of a coastal region, the wave spectral transformation in shallow water should also be treated as non-stationary. A non-stationary wave spectral transformation model is thus developed to handle these cases. Author (GRA)

N83-12832# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
GEOTECHNICAL, GEOACOUSTICAL, AND SEDIMENTOLOGI-

CAL PROPERTIES OF THIRTEEN BOTTOM SEDIMENT CORES COLLECTED IN THE SHALLOW WATER APPROACHES TO NORFOLK, VIRGINIA Final Report
L. M. Reynolds, C. Ingram, and J. Bowman Jun. 1982 83 p
(AD-A118166; NORDA-TN-152) Avail: NTIS HC A05/MF A01 CSCL 08/10

Thirteen sea bottom cores were collected by scuba divers in the shallow water approaches to Norfolk, Virginia, and were analyzed for geotechnical, geoacoustical and sedimentalogical properties. The results of these core analyses will be used with historical data in the Naval Oceanographic Office's world-wide data bank to investigate the possible existence of reliable geotechnical property relationships for the East, West, and Gulf Coasts of the United States. GRA

N83-12833# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Numerical Modeling Div.
STUDIES OF LARGE-SCALE THERMAL VARIABILITY WITH A SYNOPTIC MIXED LAYER MODEL Final Report
A. Warn-Varnas, M. Clancy, M. Morris, P. Martin, and S. Horton Jun. 1982 41 p refs
(AD-A118159; NORDA-TN-156) Avail: NTIS HC A03/MF A01 CSCL 08/10

This work was performed to investigate a number of aspects of operational ocean forecasting including model initialization and forcing, physical parameterizations, and the importance of various processes that modify upper-ocean thermal structure. A synoptic mixed-layer model was used to perform numerical simulations in the TRANSPAC region of the Central North Pacific. The multilevel model incorporates the Mellor and Yamada (1974) Level-2 turbulence parameterization and advection by wind-drift currents. Author (GRA)

N83-12834# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Ocean Science and Technology Lab.
ANNOTATED BIBLIOGRAPHY OF WATER OPTICAL PROPERTIES OF OCEAN WATERS
Robert A. Arnone May 1982 78 p
(AD-A118182; NORDA-TN-115) Avail: NTIS HC A05/MF A01 CSCL 08/10

A data base of available marine optical properties from throughout the world has been compiled in this annotated bibliography. This bibliography permits an assessment of amount and type of water optical data available and describes the limitations and problems associated with developing a marine optical data base. The data listed within the articles of this bibliography provide a reference for assessing atlas development. This data base will also provide ground truth for exploiting alternate technology; namely, remote sensing, to generated marine optics atlases. From this bibliography, problems associated with establishing a marine optical data base are rapidly seen. Aside from the problem of data being unavailable from numerous ocean/coastal areas where optical measurements have not been made, the types of marine optic properties are numerous and cannot be correlated to form a common data base. Additionally, the temporal variability of marine optics has not been adequately studied and compounds the problem of establishment of a world data base. GRA

N83-12835# Naval Ocean Research and Development Activity, Bay St. Louis, Miss. Oceanography Div.
ACOUSTICAL, PHYSICAL, AND BIOLOGICAL PROPERTIES OF SURFACE SEDIMENT CORES COLLECTED FROM LONG ISLAND SOUND, AUGUST 27-28, 1980 Final Report
Michael D. Richardson, David K. Young, and Kevin B. Briggs Jun. 1982 51 p refs
(AD-A118183; NORDA-TN-150) Avail: NTIS HC A04/MF A01 CSCL 08/10

Concurrent acoustical, physical, and biological properties were measured from three replicate core liner and three replicate box core samples collected by scuba divers from each of two locations in Long Island Sound 27-28 August 1980. Grain size distribution, porosity, and compressional wave velocity measurements were taken at 1 cm intervals in the core liner samples. Compressional wave velocities were measured at 0.5 cm intervals and porosity values at 1.0 cm intervals in the box core samples. GRA

N83-12836# Ocean Research Consultants, La Jolla, Calif.
POSSIBLE CHANGES IN SEA LEVEL AND THEIR CAUSES
Tim P. Barnett 20 Mar. 1982 74 p refs
(Contract W-7405-eng-48)
(DE82-013848; UCRL-15454) Avail: NTIS HC A04/MF A01

A new analysis of global sea level was made that avoids space/time bias of previous works. A coherent patternt of increasing relative sea level (RSL) was found to exist between 1903 to 1969. A similar analysis of the period 1930 to 1975 again showed RSL increasing everywhere but in the Western Pacific. Decrease of RSL in this area was substantiated by hydrographic data. The temporal behavior of both near global signals was well approximated by a simple linear trend. There was no evidence of a more rapid rise in RSL in recent years. If anything, the opposite was true. Subject to considerable assumption, the rate of RSL increase was 15 to 17 cm per century. Potential causes of the RSL change were investigated. Changes in the position of the Earth's axis of rotation support the idea that the RSL change was due to approximately equal melting of Greenland and Antarctica. Changes in the length of day only marginally support this idea. DOE

N83-12837# National Oceanic and Atmospheric Administration, Seattle, Wash. Environmental Research Lab.
SOURCES, COMPOSITION AND TRANSPORT OF SUSPENDED PARTICULATE MATTER IN LOWER COOK INLET AND NORTHWESTERN SHELIKOF STRAIT, ALASKA
Richard A. Feely and Gary J. Massoth Jan. 1982 35 p refs
(PB82-193236; NOAA-TR-ERL-415-PMEL-34) Avail: NTIS HC A03/MF A01 CSCL 08C

The chemical composition and seasonal distribution of suspended particulate matter collected during 1977 and 1978 in lower Cook Inlet and northwestern Shelikof Strait are compared with published data on current patterns. With respect to suspended-matter dispersal patterns, Cook Inlet shows characteristics of both an estuary and an embayment. Estuarine characteristics are exemplified by the association of the inorganic terrestrial material from upper Cook Inlet with the outward-flowing estuarine water. Plots of total suspended-matter concentrations versus salinity for surface and near-bottom waters are roughly linear for the central region of lower Cook Inlet, indicated that dilution of the estuarine water by relatively nonturbid oceanic water is the major factor controlling suspended-matter concentrations in the inlet. Embayment characteristics are indicated by the cross-channel suspended-matter gradients and by the elemental ratios of the particulate matter, which show evidence for movement of Copper River-derived aluminosilicate material across the mouth of the inlet and into Shelikof Strait. These features, which are unique to lower Cook Inlet, are a direct result of the usual nature of the current patterns existing within the inlet. GRA

N83-12838# National Oceanic and Atmospheric Administration, Rockville, Md. Engineering Development Office.
DEPTH ESTIMATION IN THE AIRBORNE OCEANOGRAPHIC LIDAR POSTFLIGHT BATHYMETRY PROCESSOR
Gary C. Guenther and Kurt Borman (EG&G Washington Analytical Services Center, Inc., Rockville, MD.) Nov. 1981 26 p refs
(PB82-188194; NOAA-82021908; NOAA-TM-OTES-2) Avail: NTIS HC A03/MF A01 CSCL 08J

Depth estimation algorithms and techniques employed in the post-flight data processing, reduction, and analysis computer programs for LIDAR bathymetry data from the NASA Airborne Oceanographic Lidar (AOL) system are described. The algorithms presented are empirical in nature and were developed over a period of time based on anaysis requirements and on experiences with the particular characteristics of the experimental data from the AOL configuration. Author (GRA)

N83-12839# National Oceanic and Atmospheric Administration, Rockville, Md. Office of Marine Pollution Assessment.

ENVIRONMENTAL ASSESSMENT OF THE ALASKAN CONTINENTAL SHELF. FINAL REPORTS OF PRINCIPAL INVESTIGATORS. VOLUME 12: BIOLOGICAL STUDIES
G. L. Hunt, J. E. Blackburn, and D. E. Rogers Aug. 1981 713 p refs Sponsored by the Bureau of Land Management
(PB82-185638) Avail: NTIS HC A99/MF A01 CSCL 08A

Reproductive ecology, foods, and foraging areas of seabirds nesting on the Pribilof Islands from 1975 to 1979 are discussed. Fish assessment in the Lower Cook Inlet estuary system, Epipelagic meroplankton, juvenile fish, and forage fish are also discussed. Their distribution and relative abundance in coastal waters near Yakutat are discussed. GRA

N83-12840# National Oceanic and Atmospheric Administration, Rockville, Md. Office of Marine Pollution Assessment.
ENVIRONMENTAL ASSESSMENT OF THE ALASKAN CONTINENTAL SHELF. FINAL REPORTS OF PRINCIPAL INVESTIGATORS. VOLUME 13: BIOLOGICAL STUDIES
B. B. McCain, Rita A. Horner, D. G. Ainley, J. R. Dunn, and A. W. Kendall Oct. 1981 848 p refs Sponsored by the Bureau of Land Management
(PB82-185646) Avail: NTIS HC A99/MF A01 CSCL 08A

The frequency and pathology of marine fish diseases in the Bering Sea, Gulf of Alaska, Norton Sound, and Chukchi Sea were determined. Beaufort sea plankton studies were carried out. The influence of petroleum on egg formation and embyronic development in seabirds, seasonal composition and food web relationships of marine organisms in the nearshore zone, were studied. Taxonomic composition, seasonal distribution, and abundance of ichthyoplankton in the nearshore zone of the kodiak archipelago, Alaska were studied. GRA

N83-12841# National Oceanic and Atmospheric Administration, Rockville, Md. Office of Marine Pollution Assessment.
ENVIRONMENTAL ASSESSMENT OF THE ALASKAN CONTINENTAL SHELF. FINAL REPORTS OF PRINCIPAL INVESTIGATORS. VOLUME 16: BIOLOGICAL STUDIES
G. L. Hunt, J. Kaiwi, D. Schneider, G. A. Sanger, and S. M. Patten Jan. 1982 609 p refs Sponsored by the Bureau of Land Management
(PB82-185653) Avail: NTIS HC A99/MF A01 CSCL 08A

The pelagic distribution of marine birds and an analysis of encounter probability for the Southeastern Bering Sea are given. The winder feeding ecology and trophic relationships of marine birds in Kachemak Bay, AK are discussed. Seasonal use of coastal habitat from Yakutat Bay to Cape Fairweather by migratory seabirds, shorebirds and waterfowl is discussed. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-12842# Materials Research Labs., Melbourne (Australia).
A GUIDE TO THE PRINCIPAL MARINE FOULING ORGANISMS, WITH PARTICULAR REFERENCE TO COCKBURN SOUND, WESTERN AUSTRALIA
John A. Lewis Jul. 1982 30 p refs
(MRL-R-858; AR-003-040) Avail: NTIS HC A03/MF A01

The principal types of marine fouling organisms collected from the marine exposure raft at HMAS STIRLING, Cockburn Sound, Western Australia, are described and twenty-nine of the most abundant species are illustrated. Less common species are listed and references are given to facilitate further identification of fouling species both at this site and elsewhere in Australia. R.J.F.

N83-12843# District of Columbia Univ., Washington, D. C. Dept. of Biology.
A NEUROBEHAVIORAL STUDY OF RATS USING A MODEL PERFLUORINATED ACID, NDFDA Final Report
Inez R. Bacon 13 Jul. 1982 20 p refs
(Grant AF-AFOSR-0136-81; AF Proj. 2312)
(AD-A118560; AFOSR-82-0634TR) Avail: NTIS HC A02/MF A01 CSCL 06/20

Fischer 344 rats were treated with 10,20, or 30 mg/kg of nonadecafluorodecanoic acid (NDFDA) on day 12 of gestation. Negative controls were given the vehicle (propylene glycol and water; 50:50) and positive controls were given a single ip injection of 500 mg/kg hydroxyurea (diluent, physiological saline). Developmental eruption, eye opening, and growth) and behavior, NDFDA was found to produce increased visuomotor development (visual placing). It is also caused decreased prenatal and postnatal weight gain, delayed cliff avoidance and surface righting, decreased open field rearing, aberrant swimming development and increased auditory startle. The observed effects indicate that NDFDA is a potential toxic neurochemical teratogen. Author (GRA)

N83-12844# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.
BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 1 Final Report, 1 Apr. 1981 - 30 Jul. 1982
H. Herbert Peel 30 Jul. 1982 60 p 3 Vol.
(Contract F49620-81-C-0059; AF Proj. 2305)
(AD-A118457; SWRI-14-6522-Vol-1; AFOSR-82-0642TR-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 01/1

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. First discussed is the human-machine symbiosis needed in systems that will become extraordinarily complex. This is followed by the related needs in developing improved human-machine information interfaces that avoid overloading the human operator or pilot. Many missions of the future will be unforgiving and of high intensity. The problems and research needed to deal with the increased stress and to protect and enhance aircrews' performance during these missions are discussed in detail. The report discusses how simulators can be advanced to provide not only better training for aircrews, but also how they can be used in the development of new systems for optimizing the human-information-machine relationship. GRA

N83-12845# Southwest Research Inst., San Antonio, Tex. Electronic Systems Div.
BIOTECHNOLOGY RESEARCH REQUIREMENTS FOR AERONAUTICAL SYSTEMS THROUGH THE YEAR 2000, VOLUME 2 Final Report, 1 Apr. 1981 - 30 Jul. 1982
H. Herbert Peel 30 Jul. 1982 204 p refs Proceedings of Biotechnol. Res. Requirements Study Session, San Antonio, 4-8 Jan. 1982 2 Vol.
(Contract F49620-81-C-0059; AF Proj. 2305)
(AD-A118458; SWRI-14-6522-Vol-2; AFOSR-82-0643TR-Vol-2) Avail: NTIS HC A10/MF A01 CSCL 01/1

This report discusses the basic biotechnology research problems that require solution by the year 2000 to ensure optimum performance of manned Air Force aeronautical systems. The projected aeronautical systems for strategic, tactical and support systems are discussed, with emphasis placed on the roles of increased automation and information processing, as well as the increased physical stress of higher performance aircraft, extended mission durations and new weapon threats. Six generic areas of biotechnology are considered, along with the research needed to address the needs of the year 2000 aircrew. Author (GRA)

N83-12846# Naval Aerospace Medical Research Lab., Pensacola, Fla.
HYPERTHERMIA IN RHESUS MONKEYS EXPOSED TO A FREQUENCY (225 MHz) NEAR WHOLE-BODY RESONANCE
W. Gregory Lotz 1 Jun. 1982 13 p refs
(MF5852402)

(AD-A118364; NAMRL-1284) Avail: NTIS HC A02/MF A01 CSCL 06/18

Exposure of rhesus monkeys to 225 MHz radiation caused severe hyperthermia at power densities greater than 5 mW/sq cm (2.3 W/kg). A comparison of body temperature responses to exposure at two frequencies, 225 and 1290 MHz, indicated that the resonant frequency (225 MHz) is at least two times more effective in causing hyperthermia than the higher frequency, even after considerations of specific absorption rate are included in the analysis. It was concluded, therefore, that the effects on rhesus monkeys of exposure to a resonant frequency (225 MHz) were substantially greater than what could be predicted based upon straightforward comparisons of dosimetric information (SAR) and the effects of exposures to a much higher frequency (1290 MHz). Author (GRA)

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N83-12847*# Massachusetts Inst. of Tech., Cambridge. Man Vehicle Lab.

A HEURISTIC MATHEMATICAL MODEL FOR THE DYNAMICS OF SENSORY CONFLICT AND MOTION SICKNESS

Charles M. Oman Aug. 1980 78 p refs

(Contract NAS9-15343; Grant NsG-2032)

(NASA-CR-169472; NAS 1.26:169472; MIT-MVLR-MVT-80-1) Avail: NTIS HC A05/MF A01 CSCL 06P

The etiology of motion sickness is explained in terms of a qualitatively formulated sensory conflict hypothesis. By consideration of the information processing task faced by the central nervous system in estimating body spatial orientation and in controlling active body movement using an internal model referenced control strategy, a mathematical model for sensory conflict generation is developed. The model postulates a major dynamic functional role for sensory conflict signals in movement control, as well as in sensory-motor adaptation. It accounts for the role of active movement in creating motion sickness symptoms in some experimental circumstances, and in alleviating them in others. The relationship between motion sickness produced by sensory rearrangement and that resulting from external motion disturbances is explicitly defined. A nonlinear conflict averaging model is proposed which describes dynamic aspects of experimentally observed subjective discomfort sensation, and suggests resulting behaviors. S.L.

N83-12848*# National Aeronautics and Space Administration, Washington, D. C.

INTAKE AND URINARY EXCRETION OF SODIUM CHLORIDE UNDER VARYING CONDITIONS OF EFFORT AND ENVIRONMENT HEAT

Ezra Zohar, Raphael Adar, Jacob Tennenbaum, and Moshe Kesten Sep. 1982 24 p refs Transl. into ENGLISH from Harefuah, J. of the Med. Assoc. of Israel (Israel), v. 60, no. 10, May 1961 p 326-332 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-76955; NAS 1.15:76955) Avail: NTIS HC A02/MF A01 CSCL 06P

Intake and urinary excretion of sodium were investigated in a group of young, healthy and acclimated men. The sodium excretions of workers and of machinists in the engine rooms of a ship were also investigated. S.L.

N83-12849*# National Aeronautics and Space Administration, Washington, D. C.

REDUCTION OF VOLUNTARY DEHYDRATION DURING EFFORT IN HOT ENVIRONMENTS

Ezra Sohar, Raphael Adar, Tuvia Gilat, Jacob Tennenbaum, and Mordehai Nir Oct. 1982 15 p refs Transl. into ENGLISH from Harefuah, J. of the Med. Assoc. of Israel (Israel), v. 60, no. 10, 15 May 1961 p 319-323 Transl. by Kanner (Leo) Associates, Redwood City, Calif. Original doc. prep. by Tel-Hashomer Government Hospital, Israel

(Contract NASw-3541)

(NASA-TM-76956; NAS 1.15:76956) Avail: NTIS HC A02/MF A01 CSCL 06P

During an experimental marching trip the daily positive fluid balance was preserved by providing a wide choice of beverages during the hours of the day. It was found that the beverage most suitable for drinking in large quantities during periods of effort was a cold drink with sweetened (citrus) fruit taste. Carbonated drinks, including beer, but milk also, were found unsuitable for this purpose. Author

N83-12850# Ohio State Univ., Columbus. Otological Research Labs.

CHANGES IN THE ORGAN OF HEARING PRODUCED BY SOUND Final Report, 1 Mar. 1977 - 1 May 1980

David J. Lim and William Melnick Wright-Patterson AFB, Ohio AMRL Jul. 1982 24 p refs

(Contract F33615-77-C-0512; AF Proj. 2312)

(AD-A118003; AFAMRL-TR-80-127) Avail: NTIS HC A02/MF A01 CSCL 06/5

This report summarizes the research done for the Air Force from March 1, 1977, to May 1, 1980, by the Otological Research Laboratories at the Ohio State University College of Medicine, David J. Lim, M.D. and William Melnick, Ph.D., principal investigators. The research was funded by Air Force contract F33615-77-C-0512. The data have been presented at national and international meetings concerning auditory function and ototrauma; in addition, twelve articles have been published or are being submitted for publication. Author (GRA)

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-12851# Telos, Oxnard, Calif.

PILOT PERFORMANCE AND STRESS: SEARCH FOR A KILLER

T. J. Snyder, Frank C. Sanders (Sanders Aircraft, Chino, Calif.), and Alexandra A. Rejzer (Camarillo State Hospital) [1981] 13 p Presented at the Spring Symp. of the Soc. for Exptl. Test Pilots, San Diego, Calif., 2-3 Apr., 1982

Avail: NTIS HC A02/MF A01

Centers on high rate of fatal and near-fatal mishaps among skilled, experienced pilots. Presents a brief description of the adaptive process of stress and defines transient, extended and chronic stress conditions. Reviews current literature on release of endorphins under stress and considers evidence for linking endorphin production to reduced performance of pilots, together with the possibility of stress addition via opioid structure of endorphins. Asks whether the characteristics for which high-risk performers are selected might actually conspire against their survival. Suggests unobtrusive methods of monitoring in-flight stress. Author

N83-12852# American Airlines, Inc., Euless, Tex.

DEFINITION OF ALASKAN AVIATION TRAINING REQUIREMENTS Final Report

Jul. 1982 189 p

Avail: NTIS HC A09/MF A01 CSCL 05I

A specially designed training program suited to the needs of Alaskan aviators was developed. Investigators travelled to 54 locations, interviewed approximately 177 air taxi operators and pilots, visited numerous aviation facilities, and attended several aviation related seminars and lectures. Respondents provided a variety of specific techniques which had helped them to prevent

hazardous situations from becoming serious accidents. Unvalidated information from the questionnaires and the training objectives is provided. N.W.

N83-12853# Federal Aviation Administration, Atlantic City, N.J. Office of Systems Engineering Management.
THE RELATIONSHIP BETWEEN EFFORT RATING AND PERFORMANCE IN A CRITICAL TRACKING TASK Final Report, Apr. - Sep. 1981
Bruce Rosenberg, Jaqueline Rehman, and Earl Stein Oct. 1982 59 p refs
(FAA Proj. 161-301-150)
(FAA-EM-81-13; FAA-CT-82-66) Avail: NTIS HC A04/MF A01

A pilot objective/subjective workload assessment technique (POSWAT) was evaluated. A critical tracking task, in which 24 subjects (pilots and nonpilots) viewed an analog display of the error between operator input and system output while correcting with opposite pressure on a joystick was used. The relationship between participant responses on a 10 point scale administered during task performance and task difficulty was determined. It is generally concluded that POSWAT used for measuring effort rating and rating delay on a regular basis during this experiment is minimally intrusive, is informative, and merits further evaluation in a cockpit environment. S.L.

N83-12854# Embry-Riddle Aeronautical Univ., Daytona Beach, Fla. Aviation Research Center.
PILOT JUDGMENT TRAINING AND EVALUATION, VOLUME 1 Final Report, Jun. 1981 - Mar. 1982
J. I. Berlin, E. V. Gruber, C. W. Holmes, P. K. Jensen, J. R. Lau, J. W. Mills, and J. M. OKane Jun. 1982 100 p refs 3 Vol.
(Contract DOT-FA-79NA-6040)
(AD-A117508; DOT/FAA-CT-82-56-I) Avail: NTIS HC A05/MF A01 CSCL 05/9

The evaluation experiment was conducted using three groups. The experimental roup received a written pretest, judgment ground and flight training, a written posttest, and an observation flight at the completion of the training. The flight control group received only the post-training observation flight. The academic control group received the written pretest and posttest along with the experimental group. The resulting data indicated statistically significant differences between the performance of experimental and control group subjects. This was true both in the acquisition of judgment concepts as measured by written tests and in the skills performance as measured during the observation flights. Two limitations to the judgment program's generalizability are the relative homogenity of the subjects and the compressed nature of the training time utilized. Author

N83-12855# Embry-Riddle Aeronautical Univ., Daytona Beach, Fla. Aviation Research Center
PILOT JUDGMENT TRAINING AND EVALUATION, VOLUME 3 Final Report, Jun 1981 - Mar 1982
J. I. Berlin, E. V. Gruber, C. W. Holmes, P. K. Jensen, J. R. Lau, J. W. Mills, and J. M. OKane Jun. 1982 143 p 3 Vol.
(Contract DOT-FA-79NA-6040)
(AD-A117508; DOT/FAA-CT-82-56-III) Avail: NTIS HC A07/MF A01 CSCL 05/9

Judgment training presentation to the content of the Student Manual, lessons for the instructor to conduct during flight training, and support materials for the instructor are presented. The instructor's role as a coach of learning and value of using behavior modification in teaching are discussed. Teaching outlines presenting judgment concepts, behavioral aspects and applications are provided. Instructor initiated exercises designed to develop, focus, and reinforce the student's judgment-making abilities during flight training activities are provided. Basic management principles of the judgment training course, and various forms and other instructional support documents are also provided. Author

N83-12856# Portland State Univ., Oreg. Dept. of Psychology.
MODELS AND ESTIMATION PROCEDURES FOR THE ANALYSIS OF SUBJECTS-BY-ITEMS DATA ARRAYS Final Technical Report
James A. Paulson 30 Jun. 1982 33 p refs
(Contract N00014-79-C-0214; RR0420601; NR Proj. 154-429)
(AD-A118730; TR-82-1) Avail: NTIS HC A03/MF A01 CSCL 05/10

Results obtained in a study of models and estimation procedures for the analysis of subjects-by-items data arrays are described. The results include a new transformation to render an array additive and some simple empirical Bayes methods for estimating subject and item marginal effects. Unfortunately, the problems which these results concern are not as central to the problems of model-based psychological measurement as originally thought. The report discusses a new problem which is crucial for the foundations of model-based mastery testing. Author

N83-12857# Hershey (Milton S.) Medical Center, Hershey, Pa. Dept. of Behavioral Science.
INFORMATION LOAD STRESS, RISK TAKING AND PHYSIOLOGICAL RESPONSIVITY IN A VISUAL-MOTOR TASK
Siegfried Streufert, Susan C. Streufert, and Ann L. Denson May 1982 27 p refs
(Contract N00014-80-C-0581; NR Proj. 170-909)
(AD-A118079; TR-ONR-8) Avail: NTIS HC A03/MF A01 CSCL 05/10

The effects of four levels of information load on physiological responsivity (blood pressure and heart rate) and on risk taking were analyzed and compared to previous results concerning the effects of load on performance. Twenty-five adults participated in a hand-eye coordination task of moderate complexity. The task was designed to permit strategic responding, risk taking and retaliatory behavior. Risk taking was measured as the degree to which subjects acted to increase the probability of a major loss in the face of potential minor gains. It is argued that an expected stress effect on risk taking and performance can be defended only if load would result in elevated arousal with risk taking and with decreasing levels of performance. It was found that participation in the present task was associated with some degree of arousal and that persons with greater (diastolic) arousal tended to take greater risks. Load affected risk taking but was not related to physiological responsivity. The potential that load as a stressor functions as a cognitive modifier of performance, and does not represent a precursor of strain (and stress), is considered. GRA

N83-12858# Navy Personnel Research and Development Center, San Diego, Calif.
MAP INTERPRETATION FOR LOW ALTITUDE FLIGHT: EVALUATION OF A PROTOTYPE COURSE Final Report
Daira Paulson Jun. 1982 19 p refs
(ZF63521080)
(AD-A118391; Rept-14-81-19; NPRDC-TR-82-47) Avail: NTIS HC A02/MF A01 CSCL 05/9

A two-part map interpretation and terrain analysis course (MITAC-II) was developed to improve the low-altitude visual orientation skills of fixed-wing pilots. Part 1, a lecture, explains and illustrates how real-world features are selected for map portrayal and how their visual significance is affected by low-altitude operations. Part 2 is composed of nine dynamic exercises designed to give practice, drill, and self-evaluation in the map interpretation principles presented in the lecture. An experimental evaluation of the course indicated that it provided a significant improvement in the location of tactical targets, but not in the identification of terrain targets. The latter finding may have been due to artifacts in the testing situation. Participants stated that low-altitude orientation skills were improved as a result of the course. It was recommended that the full MITAC-II course be implemented early in flight training. Author (GRA)

N83-12859# Naval Submarine Medical Research Lab., Groton, Conn.
THE EFFECT OF THE THERMAL CONDITIONS OF TRAINING AND TESTING ON THE PERFORMANCE OF MOTOR TASKS MEASURING PRIMARY MANUAL ABILITIES Interim Report
William H. Rogers, Ernest M. Noddin, and George Moeller 15 Jun.

1982 18 p refs
(MR0410106; MR0000101)
(AD-A118275; NSMRL-983) Avail: NTIS HC A02/MF A01 CSCL 06/19

Two groups of U.S. Marines practiced a battery of nine motor tasks in a climatic chamber during a five-day cold exposure in which the Marines lived in the chamber 24 hours a day. Subjects practiced the tasks, each of which was known to load highly on a different psychomotor factor or manual ability, once a day for the first four days and were tested on the fifth day. One group trained at 10 deg to 15 F, and the other group trained at 40 deg to 50 deg F. Both groups were then tested at both temperatures on the fifth day to test the hypothesis that subjects practiced in the cold should perform better on subsequent tests in the cold relative to subjects practiced in the warmer temperatures, and those practiced in the warmer temperatures, and those practiced in the warmer temperatures relative to subjects practiced in the cold. The hypothesis was not confirmed by the data, and methodological and theoretical problems in interpretation of that finding are discussed. Author

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-12860# National Academy of Sciences - National Research Council, Washington, D. C. Assembly of Behavioral and Social Sciences.
VISION RESEARCH FOR FLIGHT SIMULATION Final Report
Whitman Richards, ed. and Key Dismukes, ed. Brooks AFB, Tex. AFHRL Jul. 1982 108 p refs
(Contract F33615-80-C-0009)
(AD-A118721; AFHRL-TR-82-6) Avail: NTIS HC A06/MF A01 CSCL 05/8

This report is based on a workshop organized by the Committee on Vision of the National Research Council and by the Operations Training Division of the Air Force Human Resources Laboratory at Williams AFB in June 1980. The workshop brought together vision scientists from academia and government scientists concerned with research on visual displays for flight simulation. The principal objective was to provide recommendations concerning fruitful approaches for the conduct of research on what visual information is needed for simulation and how it might best be presented. Low-level flight was used as a focus for discussion of problem-solving approaches. The technical report prepared by the steering group provides examples of particular research strategies that might help elucidate several of the long-range issues in visual simulation. GRA

N83-12861# Office of Technology Assessment, Washington, D.C.
EXPLORATORY WORKSHOP ON THE SOCIAL OF ROBOTICS: SUMMARY AND ISSUES. A BACKGROUND PAPER
Feb. 1982 139 p refs
(PB82-184862; LC-82-600515) Avail: NTIS HC A07/MF A01 CSCL 05A

An exploratory workshop to examine the state of robotics technology and possible public policy issues of interest to Congress that may arise from its use is discussed. The workshop participants included researchers in robotics technology, representatives from robot manufacturing firms, and representatives from firms that use robotics technology. A summary of the results of the workshop along with copies of four background papers that were used as starting points for the discussion are given. GRA

N83-12862# National Building Research Inst., Pretoria (South Africa).
THE PHYSICAL WORKING ENVIRONMENT AND ITS EFFECT ON PRODUCTIVITY IN OFFICES
R. J. Page-Shipp 1981 20 p refs
(PB82-186461) Avail: NTIS HC A02/MF A01 CSCL 05E

Physical environmental factors that can influence productivity are discussed. Particular attention is paid to acoustics, illumination and thermal environmental conditions, with the emphasis on the role of the building design in creating productive environmental conditions. GRA

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N83-12863*# Raytheon Co., Sudbury, Mass.
CARE 3 PHASE 2 REPORT, MAINTENANCE MANUAL
L. A. Bryant and J. J. Stiffler Sep. 1982 160 p refs
(Contract NAS1-15072)
(NASA-CR-165863; NAS 1.26:165863) Avail: NTIS HC A08/MF A01 CSCL 09B

CARE 3 (Computer-Aided Reliability Estimation, version three) is a computer program designed to help estimate the reliability of complex, redundant systems. Although the program can model a wide variety of redundant structures, it was developed specifically for fault-tolerant avionics systems--systems distinguished by the need for extremely reliable performance since a system failure could well result in the loss of human life. It substantially generalizes the class of redundant configurations that could be accommodated, and includes a coverage model to determine the various coverage probabilities as a function of the applicable fault recovery mechanisms (detection delay, diagnostic scheduling interval, isolation and recovery delay, etc.). CARE 3 further generalizes the class of system structures that can be modeled and greatly expands the coverage model to take into account such effects as intermittent and transient faults, latent faults, error propagation, etc. R.J.F.

N83-12864*# Raytheon Co., Sudbury, Mass.
CARE 3 PHASE 2 REPORT, USER'S MANUAL
L. A. Bryant and J. J. Stiffler Sep. 1982 116 p refs
(Contract NAS1-15072)
(NASA-CR-165864; NAS 1.26:165864) Avail: NTIS HC A06/MF A01 CSCL 09B

CARE 3 (Computer-Aided Reliability Estimation, version three) is a computer program designed to help estimate the reliability of complex, redundant systems. Although the program can model a wide variety of redundant structures, it was developed specifically for fault-tolerant avionics systems--systems distinguished by the need for extremely reliable performance since a system failure could well result in the loss of human life. CARE 3 substantially generalizes the class of redundant configurations that could be accommodated, and includes a coverage model to determine the various coverage probabilities as a function of the applicable fault recovery mechanisms (detection delay, diagnostic scheduling interval, isolation and recover delay, etc.) CARE 3 further generalizes the class of system structures that can be modeled and greatly expands the coverage model to take into account such effects as intermittent and transient faults, latent faults, error propagation, etc. R.J.F.

N83-12865*# Raytheon Co., Sudbury, Mass.
THE CARE 3 PHASE 3 REPORT: TEST AND EVALUATION
J. J. Stiffler, J. S. Neumqnn, and L. A. Bryant Nov. 1982 172 p refs

(Contract NAS1-15072)
(NASA-CR-3631; NAS 1.26:3631) Avail: NTIS HC A08/MF A01 CSCL 09B

CARE 3 (Computer-Aided Reliability Estimation, version three) is a computer program designed to help estimate the reliability of complex, redundant systems; although the program can model a wide variety of redundant structures, it was developed specifically for fault-tolerant avionics systems, systems distinguished by the need for extremely reliable performance since a system failure could well result in the loss of human life. CARE 3 further generalizes the class of system structures that can be modeled and greatly expands the coverage model to take into account such effects as intermittent and transient faults, latent faults, error propagation, etc. The initial test and evaluation of CARE 3 are reported. Author

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N83-12866*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
EARTH OBSERVATIONS DIVISION VERSION OF THE LABORATORY FOR APPLICATIONS OF REMOTE SENSING SYSTEM (EOD-LARSYS) USER GUIDE FOR THE IBM 370/148. VOLUME 1: SYSTEM OVERVIEW
P. J. Aucoin and M. F. McKay, Principal Investigators May 1980 184 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10007; NASA-CR-167755; JSC-13821-Vol-1-Rev-A; LEMSCO-12653-Vol-1-Rev-A; NAS 1.26:167755) Avail: NTIS HC A09/MF A01 CSCL 09B

A system overview is presented for those interested in the EOD-LARSYS as programmed on the Purdue University IBM 370/148 (recently replaced by the IBM 3031) computer. All processors in the system are described and all control cards are summarized. EOD-LARSYS is the JSC version of an integrated batch system for analysis of multispectral scanner imagery data. The system is operational from remote terminals at Johnson Space Center under the virtual machine/conversational monitor system environment. A.R.H.

N83-12867# Lincoln Lab., Mass. Inst. of Tech., Lexington.
THE AMPS COMPUTER SYSTEM: DESIGN AND OPERATION
Jeffrey L. Gertz and Arnold D. Kaminsky Sep. 1982 118 p refs
(Contracts DOT-FA7WAI-242; F19628-80-C-0002)
(ATC-110; FAA-RD-81-103) Avail: NTIS HC A06/MF A01

The Lincoln Laboratory Air Traffic Control Radar Beacon System (ATCRBS) Monopulse Processing System (AMPS) is a mobile, stand-alone, ATCRBS surveillance sensor for processing and disseminating target reports from transponder-equipped aircraft. AMPS is essentially the ATCRBS portion of the Mode Select Beacon System (Mode S), a system designed to be an evolutionary replacement for the present third generation ATCRBS. AMPS utilizes several new features introduced by the Mode S sensor concept. In particular, the use of monopulse angle estimation permits more accurate aircraft azimuth estimation with fewer replies per scan, and improved decoding (identification) performance when garble is present. The details and philosophy of the AMPS computer system implementation and operation are described. Specific and detailed descriptions of the interrelations between AMPS's several subsystems and subtasks are provided as well as a guide on how to run them. Author

N83-12868*# Michigan Univ., Ann Arbor. Dept. of Electrical and Computer Engineering.
PERFORMANCE MEASURES FOR MULTIPROCESSOR CONTROLLERS
C. M. Krishna and K. G. Shin [1982] 33 p refs
(Grant NAG1-296)
(NASA-CR-169482; NAS 1.26:169482) Avail: NTIS HC A03/MF A01 CSCL 09B

Performance measures to characterize fault tolerant multiprocessors used in the context of critical processes are considered. Our performance indices are based on controller response time. By relating this to the needs of the application, we have been able to derive indices that faithfully reflect the performance of the multiprocessor in the context of the application, that permit the objective comparison of rival computer systems, and that can either be definitively estimated or objectively measured. An example of a controller in an idealized satellite application is provided. B.W.

N83-12869# Mitre Corp., Bedford, Mass.
JAMPS DATA TABLE MAINTENANCE MANUAL
W. J. Kealy and K. L. Pigott Apr. 1982 142 p
(Contract F19628-81-C-0001; AF Proj. 4100)
(AD-A118476; MTR-8426; ESD-TR-82-125) Avail: NTIS HC A07/MF A01 CSCL 09/2

The JINTACCS (Joint Interoperability of Tactical Command and Control Systems) Automated Message Preparation System (JAMPS) uses extensive data tables to store the authorized JINTACCS message structures and data elements. This document describes the various data tables and provides instructions on how to add, change, and delete information as the JINTACCS message change. Author (GRA)

N83-12870# Assessment Systems Corp., St. Paul, Minn.
DEVELOPMENT OF A MICROCOMPUTER BASED ADAPTIVE TESTING SYSTEM. PHASE 1: SPECIFICATION OF REQUIREMENTS AND PRELIMINARY DESIGN Final Report, 1 Jan. - 30 Jun. 1982
C. David Vale, Carl Albing, Lisa Foote-Lennox, and Thom Foote-Lennox 30 Jun. 1982 176 p refs
(Contract N00014-82-C-0132; NR Proj. 150-481)
(AD-A118822; ONR-ASC-82-01) Avail: NTIS HC A09/MF A01 CSCL 09/2

Specifications were developed for a microcomputer-based adaptive testing system based on reviews of item types in current use and a survey of the other related activities. From these specifications, a general system configuration was developed and the design of a general-purpose software package was initiated. This design included subsystems for test analysis. Various microcomputer systems were considered in search of hardware on which to implement the design; of these, three eight-bit microcomputer systems were selected for future consideration. A draft of a user's manual, reviewed by experts, was developed for the proposed system and served as a preliminary design document. In summary, this research indicated that a definite need exists for a microcomputer-based adaptive testing system and that the proposed system would meet that need. Author (GRA)

N83-12871# Naval Research Lab., Washington, D. C.
CALCULATION OF COSMIC-RAY INDUCED SOFT UPSETS AND SCALING IN VLSI DEVICES Interim Report
P. Shapiro, E. L. Petersen, and J. H. Adams, Jr. 26 Aug. 1982 43 p refs
(XF12141310)
(AD-A118584; NRL-MR-4864) Avail: NTIS HC A03/MF A01 CSCL 09/5

An analysis was carried out to explore the effect of size reduction on cosmic-ray induced errors in RAM's. This analysis uses a computational model and scaling procedure that are representative of those reported in current literature. Availability of various cosmic-ray environments make it possible to examine the effect of variations in the environment on predicted soft-upset rates. In addition, soft-upset rates have been calculated for the direct ionization due to protons in the radiation belts at an altitude of 600 nautical miles. GRA

N83-12872# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
BURROUGHS CORPORATION LARGE SYSTEMS FORTRAN 77
31 Dec. 1981 12 p
(PB82-183153; FCTC-81-137) Avail: NTIS HC A02/MF A01 CSCL 09B

A validation summary report (VSR) for the Burroughs Corporation Large Systems FORTRAN 77 running under III.2.360 is given. A consolidated summary of the results obtained from the validation of the subject compiler against the 1974 FORTRAN Standard (X3.9-1978/FIPS PUB 69) is included. The compiler was validated against the Subset level of FIPS PUB 69. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of descrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-12873# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
DATAPOINT 8600 COBOL RELEASE 2.1
29 Jan. 1982 12 p
(PB82-195686; FCTC-18-106) Avail: NTIS HC A02/MF A01 CSCL 09B

This FCTC Technical Report for the DATAPOINT 8600 COBOL Release 2.1 running under the RMW Release 1.9 operating system, provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Level 1 module of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). This technical report is made up of several sections showing all the descrepancies found - if any. Author (GRA)

N83-12874# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
NATIONAL CSS, INCORPORATED, IBM 360/370 OS/VS COBOL RELEASE 2.3
1 Nov. 1981 66 p
(PB82-192964; FCTC-81-116) Avail: NTIS HC A04/MF A01 CSCL 09B

A validation summary report (VSR) for the National CSS, INC., IBM 360/370 OS/VS COBOL Release 2.3 running under the VP/CSS Release .304 is given, providing a consolidated summary of the results obtained from the validation of the subject compiler was validated against the High-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the descrepancies found - if any. These include an overview of the validation which lists all categories of descrepancies by level/module within X3.23-1974, a section relating the categories of discrepanies to each of Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-12875# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
WANG LABORATORIES INC., VS COBOL VERSION 3, 4, 1, TECHNICAL REPORT
30 Nov. 1981 12 p
(PB82-195629; FCTC-81-39) Avail: NTIS HC A02/MF A01 CSCL 09B

COBOL Version 3.4.1 running under the O.S. Release 5 operating system is discussed. A consolidated summary of the results obtained from the evaluation of the subject compiler against the Indexed I-O Level 1 modules of the 1974 COBOL Standard is given. Several sections showing all the discrepancies found - if any are included. A companion Validation Summary Report FCTC-81-128 provides information regarding the validation of the compiler as the Low level of Federal Standard COBOL. GRA

N83-12876# Intermetrics, Inc., Bethesda, Md.
PASCAL COMPILER FUNCTIONAL SPECIFICATION
Gary Bray, Roger Lipset, William Bail, and Victor Berman 18 Dec. 1980 40 p
(PB82-183989; NBS-GCR-82-376; IR-576) Avail: NTIS HC A03/MF A01 CSCL 09B

A functional specification for a Pascal compiler system is reported that incorporates an integrated set of software development capabilities. The capabilities include automated support for program design, documentation, implementation, debugging, and maintenance. Author (GRA)

N83-12877# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
VALIDATION SUMMARY REPORT; NCR CORPORATION V8570 VRX FORTRAN 10
5 Jan. 1982 12 p
(PB82-183641; FCTC-81-139) Avail: NTIS HC A02/MF A01 CSCL 09B

A consolidated summary of the results obtained from the validation of the subject compiler against the 1974 FORTRAN Standard (X3.9-1978/FIPS PUB 69) is provided. The compiler was validated against the Subset level of FIPS PUB 69. The VSR is made up of several sections showing all the descrepancies found, if any. These include an overview of the validation which lists all categories of descrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed.Author (GRA)

N83-12878# Federal Compiler Testing Center, Falls Church, Va. Office of Software Dept.
THE SPERRY UNIVAC V77 SERIES: COBOL 74-800 RELEASE IRO Validation Summary Report
31 Oct. 1981 68 p refs
(PB82-193269; FCTC-81-110) Avail: NTIS HC A04/MF A01 CSCL 09B

This validation summary report (VSR) for the Sperry Univac V77 Series COBOL 74-800 Release IRO running under the V77 VORTEX Release 8RI operating system provides a consolidated summary of the results obtained from he validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the Low-Intermediate level of FIPS PUB 21-1. The VSR is made up of several sections showing all the descrepancies found - if any. These include an overview of the validation which lists all categories of descrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. Author (GRA)

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-12879*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A FAST HIDDEN LINE ALGORITHM FOR PLOTTING FINITE ELEMENT MODELS
Gary K. Jones Aug. 1982 57 p refs
(NASA-TM-83981; NAS 1.15:83981) Avail: NTIS HC A04/MF A01 CSCL 09B

Effective plotting of finite element models requires the use of fast hidden line plot techniques that provide interactive response. A high speed hidden line technique was developed to facilitate the plotting of NASTRAN finite element models. Based on testing using 14 different models, the new hidden line algorithm (JONES-D) appears to be very fast: its speed equals that for normal (all lines visible) plotting and when compared to other existing methods it appears to be substantially faster. It also appears to be very reliable: no plot errors were observed using the new method to plot NASTRAN models. The new algorithm was made part of the NPLOT NASTRAN plot package and was used by structural analysts for normal production tasks. Author

N83-12880*# Maryland Univ., College Park. Dept. of Computer Science.
SOFTWARE ENGINEERING LABORATORY (SEL) REPORT TO

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Victor Basili 1982 17 p refs
(Contract NsG-5123)
(NASA-CR-169476; NAS 1.26:169476) Avail: NTIS HC A02/MF A01 CSCL 09B

Software development predictors, error analysis, reliability models and software metric analysis are studied. The use of dynamic characteristics as predictors for software development is also studied. S.L.

N83-12881*# National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
USER'S MANUAL FOR THPLOT, A FORTRAN 77 COMPUTER PROGRAM FOR TIME HISTORY PLOTTING
James E. Murray Oct. 1982 20 p refs
(NASA-TM-81374; NAS 1.15:81374) Avail: NTIS HC A02/MF A01 CSCL 09B

A general purpose FORTRAN 77 computer program (THPLOT) for plotting time histories using Calcomp pen plotters is described. The program is designed to read a time history data file and to generate time history plots for selected time intervals and/or selected data channels. The capabilities of the program are described. The card input required to define the plotting operation is described and examples of card input and the resulting plotted output are given. The examples are followed by a description of the printed output, including both normal output and error messages. Lastly, implementation of the program is described. A complete listing of the program with reference maps produced by the CDC FTN 5.0 compiler is included. M.G.

N83-12882*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DE MAGNETOMETER PREPROCESSOR USERS GUIDE
L. M. Salter and J. B. Byrnes Sep. 1982 81 p refs
(NASA-TM-83999; NAS 1.15:83999) Avail: NTIS HC A05/MF A01 CSCL 09B

A users guide for the Dynamics Explorer magnetometer preprocessor computer program is provided. This program is written in Xerox Extended FORTRAN IV and is used to process telemetry data in order to provide data files for use in analysis programs. This preprocessor is designed to operate on the Sigma 9 and the IBM 4341. Author

N83-12883# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SITIM SYSTEM: PRELIMINARY SOFTWARE DESIGN [SISTEM SITIM - PROJETO PRELIMINAR DO SUPORTE LOGICO]
Flavio Roberto Dias Velasco and Ubirajara M. Barsotti deLima Aug. 1982 36 p In PORTUGUESE; ENGLISH summary
(INPE-2499-NTE/190) Avail: NTIS HC A03/MF A01

The preliminary software design of an image processing interactive system is described both functionally and structurally, in terms of its subsystems. A proposal for a system communication language is also presented. Author

N83-12884# Argonne National Lab., Ill. Applied Mathematics Div.
GUIDELINES FOR USING THE AMDLIB, IMSL AND NAG MATHEMATICAL SOFTWARE LIBRARIES AT ANL
Jesse Y. Wang, ed., Burton S. Garbow, and Margaret M. Cekis Sep. 1981 68 p refs
(Contract W-31-109-eng-38)
(ANL-81-73) Avail: NTIS HC A04/MF A01

The numerical software contained in the Applied Mathematics Division Subroutine Library (AMDLIB), the International Mathematical & Statistical Libraries, Inc. (IMSL), and the Numerical Algorithms Group, Ltd. (NAG) mathematical libraries is summarized. Seventeen numberical analysis subjects are discussed, and the appropriate subroutines available in the three libraries for solving each type of problem are listed, with our recommendations for particular types of applications. Author

N83-12885# Naval Research Lab., Washington, D. C. Computer Science and Systems Branch.
A FORMAL FOUNDATION FOR THE TRACE METHOD OF SOFTWARE SPECIFICATION Interim Report
J. McLean 1 Sep. 1982 63 p refs
(Grant NSF 1-0-110-3276-XA452; RR0140491)
(AD-A118843; NRL-MR-4874) Avail: NTIS HC A04/MF A01 CSCL 09/2

An overview of the trace method for the abstract specification of software is followed by a syntax, semantics, and derivation system for the method. This foundation supports a comparison of the trace method with the algebraic approaches to abstract specification, while completeness and soundness theorems suggest methods for proving specifications consistent and sufficiently-complete. Areas for future research are discussed. Author (GRA)

N83-12886# Stanford Research Inst., Menlo Park, Calif. Augmentation Research Center.
NATIONAL SOFTWARE WORKS DEVELOPMENT Final Report
Beverly Boli and Richard W. Watson Sep. 1976 34 p refs
(Contracts F30602-75-C-0320; F30602-75-C-0156; ARPA Order 2853; SRI Proj. 4051)
(AD-A118494) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Frontend provides the logical or conceptual function of interfacing a user to the NSW (Works Manager and tools). The initial Frontend consists of a PDP-11 satellite, providing terminal control and command language services, and a Help system running on a remote PDP-10. The Frontend also runs on a PDP-10. Frontend and Works Manager services are a logical whole as seen by the user and constitute an NSW Executive. GRA

N83-12887# Boeing Aerospace Co., Houston, Tex.
SNEAK ANALYSIS APPLICATION GUIDELINES Final Technical Report, 3 Feb. 1981 - 12 Mar. 1982
Davey L. Buratti and Sylvia G. Godoy Griffiss AFB, N.Y. RADC Jun. 1982 234 p refs
(Contract F30602-81-C-0053; AF Proj. 2338)
(AD-A118479; RADC-TR-82-179) Avail: NTIS HC A11/MF A01 CSCL 09/2

Sneak analysis is an engineering tool which can used to identify designed-in conditions that can inhibit desired system functions resulting in lower operational reliability. The objective of this study was to develop guidelines for applying sneak analysis to hardware and software contracts in a cost effective manner. Specific guidelines for establishment of sneak analysis requirements, monitoring of sneak analysis efforts, determining program costs, evaluation criteria and determining candidate equipments have been defined. Criteria for tailoring the guidelines to the program needs have also been established. A measure of sneak analysis effectiveness was determined which shows excellent results in early program development phases including improved system reliability. Author (GRA)

N83-12888# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Automatic Data Processing Center.
USERS GUIDE: COMPUTER PROGRAM FOR BEARING CAPACITY ANALYSES OF SHALLOW FOUNDATIONS (CBEAR) Final Report
Reed L. Mosher and Michael E. Pace Jun. 1982 113 p refs
(AD-A118487; WES-INSTRUCTION-K-82-7) Avail: NTIS HC A06/MF A01 CSCL 09/2

This user's guide documents a computer program called CBEAR that can be used for analysis of the bearing capacity of shallow strip, rectangular, square, or circular foundations on one- or two-layer soil systems. GRA

N83-12889# Colorado State Univ., Fort Collins.
VITERBI TRACKING OF RANDOMLY PHASE-MODULATED DATA (AND RELATED TOPICS) Final Report, 1 Sep. 1979 - 15 Feb. 1982
Louis L. Scharf 10 Aug. 1982 73 p refs Prepared in cooperation with Rhode Island Univ.

(Contract DAAG29-79-C-0176)
(AD-A118613; ARO-16437.9-EL) Avail: NTIS HC A04/MF A01 CSCL 12/1

In this final report we formulate the problems of phase and frequency estimation as fixed interval smoothing problems. Forward dynamic programming algorithms are derived to find maximum posterior sequence estimates that pass likely sequences through the data. The algorithms extend the threshold usually associated with phase lock loops. The algorithms are applied to simultaneous phase estimation and data decoding in phase jitter channels. The resulting error probabilities are the lowest currently achievable. The results indicate that there are many problems in the domain of filtering and signal processing that can be profitably reformulated as sequence estimation problems. Our interest in likelihood leads us from frequency tracking to exact likelihood for autoregressive moving average (ARMA) data. Fast Kalman filtering algorithms are derived for constructing exact likelihood in multivariable ARMA models. Several interesting connections are established between Wold, Kolmogorov, Wiener, and Kalman representations of stationary time series. Ideas are proposed for associating spectra with linear transformations. GRA

N83-12890# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Electrical Engineering.
MICROPROCESSOR SELF-TEST: SOFTWARE SELF-TEST FOR AN 8080-BASED SYSTEM USING A MINIMUM OF ADDITIONAL HARDWARE Final Technical Report, 1 Sep. 1980 - 31 Aug. 1981
James R. Armstrong and F. Gail Gray Griffiss AFB, N.Y. RADC Jun. 1982 242 p refs
(Contract F30602-80-C-0200; AF Proj. 5581)
(AD-A118826; RADC-TR-82-80) Avail: NTIS HC A11/MF A01 CSCL 09/2

A self-test program for an 8080-based microprocessor system is developed and verified using both high-level simulation and actual hardware components. The goals were minimum execution time, minimum added hardware, and minimum impact on applications software. Within these constraints, maximum fault coverage was obtained. A high-level simulation language (GSP) was used to verify the execution of the self-test program and to determine the fault coverage. The self-test programs provided excellent diagnostic routines to test the simulation models and indeed were used to discover several faulty simulation models. Finally, a complete self-testing hardware system was constructed to verify that the self-test program would run in the background of an applications program. Author (GRA)

N83-12891# Softech, Inc., Dayton, Ohio.
JOVIAL J73 PROGRAMMING SUPPORT LIBRARY Final Technical Report, Jul. 1980 - Jan. 1982
Andrew J. Cruscicki (RADC, Griffiss AFB, N.Y.), Louis Simpson, and R. Sheffield Griffiss AFB, N.Y. RADC Jun. 1982 59 p
(Contract F30602-80-C-0244; AF Proj. 2532)
(AD-A118825; RADC-TR-82-162) Avail: NTIS HC A04/MF A01 CSCL 09/2

The JOVIAL J73 Programming Support Library (J73 PSL), an environment for the orderly creation of J73 Software Systems, is presented. This technical report has been developed as a self-contained/stand-alone document. That is, the TR first presents a thorough contract overview followed by a discussion of the technological concepts (i.e., Top-down programming and segmentation) incorporated as features of the J73PSL. A brief command verb summary then proceeds a section devoted to the relationship between the J73PSL and configuration control and management. The remainder of the TR is devoted to certain project tasks followed by a discussion of perceived future directions for this technology. Author (GRA)

N83-12892# Rhode Island Univ., Kingston. Dept. of Computer Science and Statistics.
ALGORITHMIC COMPLEXITY, VOLUME 2 Final Technical Report, Jun. 1979 - Aug. 1981
Edmund A. Lamagna, Leonard J. Bass, Lyle A. Anderson, Ralph E. Bunker, and Philip J. Janus Griffiss AFB, N.Y. RADC Jun. 1982 353 p refs 2 Vol.
(Contract F30602-79-C-0124)
(AD-A118814; Rept-81-161-Vol-2; RADC-TR-152-Vol-2) Avail: NTIS HC A16/MF A01 CSCL 09/2

The objective of this study was to conduct applied research directed toward understanding the relationship between the complexity or efficiency of algorithms and the overall quality of computer software. The final report is presented in a two volume series consisting of a total of eight parts. This volume, containing parts 3 through 8 describes the results of several technical investigations which are conducted. Part 3 is a tutorial on computational algebra, illustrating the nature of research in the area of algorithm analysis and computational complexity. Part 4 develops a systematic approach to the analysis of algorithms. Part 5 is an experimental analysis of a fast, new sorting method called DPS (distributive partitioning sorting). Part 6 applies order statistics to investigate the expected quality of several approximation algorithms for the Euclidean traveling salesman problem, known to be NP-complete. Part 7 presents a survey of data base access methods for both univariate and multivariate range queries. Part 8 describes an experimental evaluation of the frame memory model of a data base structure. GRA

N83-12893# Rhode Island Univ., Kingston. Dept. of Computer Science and Statistics.
ALGORITHMIC COMPLEXITY, VOLUME 1 Final Technical Report, Jun. 1979 - Aug. 1981
Edmund A. Lamagna, Leonard J. Bass, Lyle A. Anderson, Ralph E. Bunker, and Philip J. Janus Griffiss AFB, N.Y. RADC Jun. 1982 129 p refs 2 Vol.
(Contract F30602-79-C-0124)
(AD-A118813; Rept-81-161-Vol-1; RADC-TR-82-152-Vol-1) Avail: NTIS HC A07/MF A01 CSCL 09/2

The objective of this study was to conduct applied research directed toward understanding the relationship between the complexity or efficiency of algorithms and the overall quality of computer software. The final report is presented in a two volume series consisting of a total of eight parts. This volume, containing Parts 1 and 2, comprises a general introduction to the entire series and a research plan. Part 1 begins with a description of the goals of the overall contract effort. This is followed by a discussion of previous RADC work on software quality metrics, emphasizing measures concerned with the time and storage efficiency of programs. Next, an overview of the field of algorithm analysis and computational complexity is given. A final section contains an introduction to the particular research investigations pursued in the other portions of this study. Part 2 presents a research plan for advancing the state-of-the-art in the area of algorithm performance. An Appendix contains an outline of the major topics and issues addressed in the area of algorithm analysis and computational complexity, together with an annotated select bibliography. GRA

N83-12894# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
ALGORITHMS FOR PROGRAM VERIFICATION Final Report, 1 Jul. 1980 - 30 Jun. 1981
Vaughan R. Pratt May 1982 8 p refs
(Grant AF-AFOSR-0225-80; AF Proj. 2304)
(AD-A118570; AFOSR-82-0645TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

In the previous reporting period, July 1979 to June 1980, work was performed on (1) foundations for specifying automatic program verifiers (Pr1,Pr3), (2) decision methods for a large fragment of the basic logic of programs (Pr5), (3) implementation of a decision method for propositional dynamic logic, and (4) continued maintenance of MITVI (LP), a program verifier incorporating some of these ideas. In the current (and final) reporting period, the research emphasis shifted from the verification of sequential programs to that of dataflow programs. This week has led to new insights into the correspondence between functions and processes (Pr4,Pr7). It has also stimulated work on a new approach to user

environments (Pr6). And it has raised, though not answered, problems concerning automated verification of dataflow programs.
Author (GRA)

N83-12895# Comarco, Inc., Anaheim, Calif.
COMPUTER AIDED MISSION PLANNING SYSTEM (CAMPS) Final Technical Report, 1 Jul. 1979 - 1 Oct. 1981
D. Bailey, D. Frye, and W. Woodbury Griffiss AFB, N.Y. RADC Jun. 1982 50 p
(Contract F30602-79-C-0230; AF Proj. 2315)
(AD-A118567; RADC-TR-82-148) Avail: NTIS HC A03/MF A01 CSCL 09/2

Algorithms and computer programs were developed to automate a wing/squadron level capability for flight planning and penetration analysis for the F-4E and F-111F; and weapons planning for the F-4E with a limited set of weapons and release conditions. Author (GRA)

N83-12896# Georgia Inst. of Tech., Atlanta. School of Information and Computer Science.
EQUIVALENCE TESTING FOR FORTRAN MUTATION SYSTEM USING DATA FLOW ANALYSIS M.S. Thesis. Interim Technical Report
Akihiko Tanaka Dec. 1981 76 p refs
(Contracts N00014-79-C-0231; DAAG29-80-C-0120)
(AD-A118840; GIT-ICS-82/10) Avail: NTIS HC A05/MF A01 CSCL 09/2

Program mutation is a new approach to program testing, a method designed to test whether a program is either correct or radically incorrect. It requires the creation of a nearly correct program called a mutant from a program P. An adequate set of test data distinguishes all mutants from P by comparing the outputs. Obviously, an equivalent mutant, which performs identically to P, produces the same outputs as those of P. Thus, for adequate data selection, it is desirable that an equivalent mutant be excluded from the testing process. For this purpose, the system equivalence command has been implemented as an equivalent mutant detector. As yet, the command has not been automated. Automatic detection by this command is implemented here as an application of data flow analysis. Algorithms and implementation techniques of data flow analysis are described. Also its application as an automatic detector is described. Author (GRA)

N83-12897# Texas Univ., Austin. Dept. of Computer Sciences.
DEVELOPMENT OF AN IMAGE SEGMENTATION ALGORITHM CALLED MITES Final Report, 1 Mar. 1981 - 28 Feb. 1982
Larry S. Davis Apr. 1982 6 p refs
(Grant AF-AFOSR-0080-81; AF Proj. 2304)
(AD-A118577; AFOSR-82-0663TR) Avail: NTIS HC A02/MF A01 CSCL 09/2

This report summarizes progress made under support of the grant; developing an image segmentation algorithm called MITES; and recovering the three dimensional orientation of a planar textured surface from an image of that surface. Author (GRA)

N83-12898# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
SOFTWARE FOR THREE DIMENSIONAL TOPOGRAPHIC SCIENCES
Joseph H. Honablew (Army Engineer Topographic Lab.), Joseph J. Schlueter, and Arthur A. Noma Aug. 1982 25 p refs
(AD-A118465; AUTO-CARTO-5/ISPRSIV) Avail: NTIS HC A02/MF A01 CSCL 09/2

The paper discusses the current capability for portraying three dimensional topographic scenes at the Defense Mapping Agency, Hydrographic/Topographic Center and a background of its current usage and potential applications. A number of illustrations of scenes produced using Digital Terrain Elevation Data (DTED) and overlayed Digital Feature Analysis Data (DFAD) will be presented. Planned enhancements will be discussed with illustrations of type of results to be produced. Author (GRA)

N83-12899# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
ON-LINE PATTERN ANALYSIS AND RECOGNITION SYSTEM, OLPARS 6. PROGRAMMER AND SYSTEM MAINTENANCE MANUAL
Steven E. Haehn and Donna A. Morris 18 Jun. 1982 278 p 3 Vol.
(AD-A118731; PAR-82-15) Avail: NTIS HC A13/MF A01 CSCL 09/2

The OLPARS Programmer and System Maintenance Manual (or Programmer's Reference Manual) contains the detailed information about the structure of all the files used in 'portable' OLPARS. The manual also describes how to access the information contained in these files. A separate section describes the different 'displays' OLPARS Generates, along with detailed information about the contents of the user's "display" files. Terminal and text-file input and output packages are described in detail here, also. Author (GRA)

N83-12900# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
ON-LINE PATTERN ANALYSIS AND RECOGNITION SYSTEM, OLPARS 6. SOFTWARE REFERENCE MANUAL
Steven E. Haehn and Donna A. Morris 18 Jun. 1982 930 p 3 Vol.
(AD-A118732; PAR-82-20) Avail: NTIS HC A99/MF A01 CSCL 09/2

There are 2 manuals referred to under this title: A Programmers Reference and Maintenance Manual (PRM), and a Software Reference Manual (SRM). The PRM gives a detailed view on OLPARS and data structures and concepts. The SRM gives detailed information on all the OLPARS commands and their subprograms (e.g., calling sequences, function). Author (GRA)

N83-12901# Pattern Analysis and Recognition Corp., New Hartford, N.Y.
ON-LINE PATTERN ANALYSIS AND RECOGNITION SYSTEM, OLPARS 6. USERS MANUAL
Steven E. Haehn and Donna A. Morris 18 Jun. 1982 380 p refs 3 Vol.
(AD-A118733; PAR-82-21) Avail: NTIS HC A17/MF A01 CSCL 09/2

The User's Manual introduces the reader to OLPARS concepts, some pattern recognition methodology, and the OLPARS displays. Instructions example usage of each OLPARS command is included. Author (GRA)

N83-12902# Army War Coll., Carlisle Barracks, Pa.
A DATA REDUCTION PACKAGE FOR US ARMY TOPOGRAPHIC COMPUTERS: HAND-HELD PROGRAMMABLE CALCULATORS
Walter Blackmer (Defense Mapping Agency) 14 May 1982 103 p refs
(AD-A118854) Avail: NTIS HC A06/MF A01 CSCL 09/2

This study was done to provide the US Army with the basis for a standardized program package for use with hand-held, programmable calculators. The programs are written and published in a format which is immediately useable with the Texas Instruments Programmable 59 Calculator, but which can easily be adapted for use with other programmable calculators. Other Department of Defense agencies may also find them valuable in training and operational efforts. The study includes a general overview of the history of the Topographical Engineers.
Author (GRA)

N83-12903# Sandia Labs., Albuquerque, N. Mex. Electrical Components Div.
FILTER CHARACTERIZATION
Charles P. Stanton Jul. 1982 41 p
(Contract DE-AC04-76DP-00789)
(DE82-020466; SAND-81-2489) Avail: NTIS HC A03/MF A01

Some insight into the characteristic response of filters versus frequency and loading is presented. A computer program is

provided which allows the user to vary the filter model in order to assess the effect of specific conditions. DOE

N83-12904# Sandia Labs., Albuquerque, N. Mex.
STARTING STEP SIZE FOR AN ODE SOLVER
H. A. Watts Jul. 1982 40 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020422; SAND-80-1734) Avail: NTIS HC A03/MF A01

An algorithm for obtaining a good starting step size is discussed and a subroutine which can be readily used in most ordinary differential equation solvers. DOE

N83-12905# Argonne National Lab., Ill. Applied Mathematics Div.
COMPUTING A TRUST REGION STEP
Jorge J. More and D. C. Sorensen Dec. 1981 24 p refs
(Contract W-31-109-eng-38)
(DE82-005656; ANL-81-83) Avail: NTIS HC A02/MF A01

An algorithm for the problem of minimizing a quadratic function subject to an ellipsoidal constraint is proposed which is guaranteed to produce a nearly optimal solution in a finite number of iterations. A robust and efficient algorithm for this problem is required to compute the step between iterates in trust region methods for optimization problems. The use of the algorithm in a trust region Newton's method is also considered. In particular, it is proved that under reasonable assumptions the sequence (X sub K) generated by Newton's method has a limit point X* which satisfies the first and second order necessary conditions for a minimizer of the objective function f. Numerical results for GQTPAR, which is a FORTRAN implementation of the algorithm, show that GQTPAR is quite successful in a trust region method. In tests a call to GQTPAR only required 1.6 iterations on the average. DOE

N83-12906# Oak Ridge National Lab., Tenn. Computer Sciences.
USER'S GUIDE FOR BAYES: A GENERAL PURPOSE CODE FOR FITTING A FUNCTIONAL FORM TO EXPERIMENTAL DATA
Nancy M. Larson Aug. 1982 213 p refs
(Contract W-7405-eng-26)
(DE82-021092; ORNL-TM-8185) Avail: NTIS HC A10/MF A01

A user's manual is presented for a general-purpose computer program BAYES to solve Bayes equations for updating parameter values, uncertainties, and correlations. Bayes equations are derived from Bayes theorem, using linearity and normality assumptions. The method of solution is described, and details are given for adapting the code for a specific purpose. Numerous examples are given, including problem description and solution method, FORTRAN coding, and sample input and output. A companion code LEAST, which solves the usual least-squares equations rather than Bayes equations but which encourages nondiagonal data weighting, is also described. DOE

N83-12907# Los Alamos Scientific Lab., N. Mex.
FITS: A FUNCTION FITTING PROGRAM
Silvio J. Balestrini and Curtis G. Chezem Aug. 1982 28 p refs
(Contract W-7405-eng-36)
(DE82-021259; LA-9111-M-Rev) Avail: NTIS HC A03/MF A01

An iterating computer program, FITS, is described which adjusts the parameters of a function to fit a set of data ponts according to the least squares criterion and then lists and plots the results. The function can be programmed or chosen from a library that is provided. The library can be expanded to include up to 99 functions. A general plotting routine, contained in the program but useful in its own right, is described separately. An example problem file and is solution is given. DOE

N83-12908# Los Alamos Scientific Lab., N. Mex.
THE PERFLD: A FORTRAN SUBROUTINE TO CALCULATE FIRST-ORDER PERTURBATIONS FOR TWO-DIMENSIONAL SYMMETRIC MULTIPOLES
E. Alan Wadlinger and Louise Taylor, ed. Aug. 1982 8 p refs
(Contract W-7405-eng-36)
(DE82-021271; LA-9501-MS) Avail: NTIS HC A02/MF A01

A FORTRAN subroutine, PERFLD that calculates perturbation effects for two dimensional symmetric multipoles (electric or magnetic) is presented. The PERFLD uses the algorithms and tables from first order perturbation effects in iron dominated two dimensional symmetrical multipoles. The perturbations considered are error excitation, pole displacement, and rotation. DOE

N83-12909# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
IBM 3033 OS/VS COBOL RELEASE 2.3
Dec. 1981 72 p refs
(PB82-192766; FCTC-81-140) Avail: NTIS HC A05/MF A01
CSCL 09B

A validation summary report (VSR) for the IBM 3033 OS/VS COBOL Release 2.3 running under the MVS/SP Release 1.1 operating system is given, providing a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard. The compiler was validated against the High level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found - if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-12910# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
BURROUGHS CORPORATION CP9572 CSM SYSTEM COBOL RELEASE
15 Dec. 1981 56 p
(PB82-186933; FCTC-81-126) Avail: NTIS HC A04/MF A01
CSCL 09B

A validation summary report (VSR) for the Burroughs Corporation CP9572 CMS System COBOL Release 3.3 running under CM9500 MCP Release 3.3 is given. A consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1) is provided. The compiler was validated against the Low level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-12911# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
SPERRY UNIVAC OS.3 COBOL VERSION 07.00/58
31 Jan. 1982 71 p refs
(PB82-184920; FCTC-81-147) Avail: NTIS HC A04/MF A01
CSCL 09B

A validation summary report (VSR) for the Sperry Univac OS.3 COBOL Version 07.00/58 running under the OS/3 Level 7.1 operating system is given, providing a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard. The compiler was validated against the High level of FIPS PUB 21-1. The VSR is made up of several sections showing all the descrepancies found - if any. These include an overview of the validation which lists all categories of descrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-12912# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
THE MODCOMP NASA EXTENED FORTRAN 78 Validation Summary Report
19 Jan. 1982 13 p refs
(PB82-183146; PCTC-82/115) Avail: NTIS HC A02/MF A01
CSCL 09B

This validation summary report (VSR) for the MODCOMP NASA Extended FORTRAN 78 running under MAX IV provides a

consolidated summary of the results obtained from the validation of the subject compiler against the 1974 FORTRAN Standard (X3.9-1978/FIPS PUB 69). The compiler was validated against the Subsert level of FIPS PUB 69. The VSR is made up of several sections showing all the descrepancies found - if any. These include an overview of the validation which lists all categories of descrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. Author (GRA)

N83-12913# Physical Research Lab., Ahmedabad (India).
STRUCTURED PROGRAMMING AND PASCAL: A NEW PROGRAMMING LANGUAGE
D. R. Kulkarni Jan. 1982 65 p refs
(PB82-188921; PRL/TN-82-01) Avail: NTIS HC A04/MF A01 CSCL 09B

A definition of computer programming is developed and structured programming and the PASCAL programming language are discussed in relation to software engineering. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N83-12914# Brookhaven National Lab., Upton, N. Y.
TRADITIONAL COMPUTING CENTER AS A MODERN NETWORK NODE
S. Heller and A. M. Peskin Nov. 1981 17 p refs
(Contract DE-AC02-76CH-00016)
(DE82-006935; BNL-30609) Avail: NTIS HC A02/MF A01

There is an obvious trend toward decentralization of computing power from the traditional, large computing center. Even so there remains a generous, but changing role for such centers to play. Their capabilities would then be complimentary to smaller, individualized facilities, so the user would benefit greatly from a general purpose, local network on which the large center represented a node. There is no network currently available that exhibits all the attributes of the ideal local for this environment. It can be approached, however, by combining several diverse products as network segments, which are interconnected via processor gateways. The attributes of the ideal network are presented. A brief discussion of the current state-of-the-art in networking is then given. Finally, the particulars of the Brookhaven implementation are offered as a case history. DOE

N83-12915# Sandia Labs., Albuquerque, N. Mex. Scientific Network Design Div.
IMPLEMENTATION OF A DISTRIBUTED COMPUTING GATEWAY (DCG) AT SANDIA NATIONAL LABORATORIES
Ronald C. Hall and DeNise H. Widman Jun. 1982 21 p refs Presented at the NEXIUS Gen. Meeting, Atlanta, 31 Mar. - 1 Apr. 1982
(Contract DE-AC04-76DP-00789)
(DE82-020120; SAND-82-0490) Avail: NTIS HC A02/MF A01

Several modifications to the Sandia National Laboratories current scientific Central Computing Facility (CCF) are being made. These modifications include development of a Central Computing Network (CCN) and a dispersed Distributed Computing Network (DCN). It is necessary to develop a gateway between these two networks. This connection will permit distributed computers in the DCN to gain access to the data link, various support nodes, and the worker computers in the CCF. This presentation describes current efforts at Sandia National Laboratories to implement a VAX/VMS Distributed Computing Gateway (DCG) to serve as an interface node between the CCN and DCN. The functional characteristics of the DCG are identified. The hardware and software configurations are overviewed. Finally, security considerations pertinent to the implementation are addressed. DOE

N83-12916# Los Alamos Scientific Lab., N. Mex.
INTERCONNECTING COMPUTERS WITH THE HIGHSPEED PARALLEL INTERFACE
D. E. Tolmie, A. G. Dornhoff, S. C. Tenbrick, and Elaine Stanlick, ed. Aug. 1982 8 p refs
(Contract W-7405-eng-36)
(DE82-021260; LA-9503-MS) Avail: NTIS HC A02/MF A01

Computer network architectures were evaluated for use in support of scientific research. It was determined that a store and forward switched message system built around hardware products, high-speed parallel interfaces (HSPIs), was superior in this application to the more conventional contention bus systems. The HSPI interfaces, along with some dedicated computers used as intermediate switching nodes, implement this store and forward architecture and form the backbone of the integrated computer network (ICN). The HSPI channel standard was developed for the interconnection of computers of different manufacture. Reliable full duplex point to point data transfers at speeds up to 50 million bits per second are accommodated. Extensive error detection and error correction capabilities are included in the HSPI hardware. The HSPI specifications and use of the HSPIs in the network are discussed. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N83-12917# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IMPLEMENTATION AND TESTING OF A SUBOPTIMAL PROCEDURE FOR ATTAINING CONTROL IN DYNAMIC OPTIMIZATION PROBLEMS M.S. Thesis [IMPLEMENTACAO E TESTE DE UM PROCEDIMENTO SUBOTIMO PARA A OBTENCAO DO CONTROLE EM PROBLEMAS DE OTIMIZACAO DINAMICA]
Luiz Antonio Waack Bambace Aug. 1982 152 p refs In PORTUGUESE; ENGLISH summary
(INPE-20508-TDL/098) Avail: NTIS HC A08/MF A01

This work consists of implementation and testing of a direct search procedure to obtain suboptimal numerical solutions, by control restriction, for open loop optimization of dynamic systems problems. By taking a control function approximation which is characterized by a vector of parameters, the dynamic problem is reduced to one of parameter optimization. A direct search criterion plus linear perturbation are combined with Kalman Filter to find search increment in each step. Following most of the authors working with other suboptimal procedures, which can be considered by comparison, a plane minimum time, low thrust Earth-Mars orbit transfer problem is considered to test numerical performance. Results obtained show that in terms of accuracy, computacional time and computer memory space, the procedure is very competitive when compared to most of the modern methods used in the numerical optimization of dynamic systems. Author

N83-12918# Massachusetts Univ., Amherst. Dept. of Electrical and Computer Engineering.
RESEARCH IN ADAPTIVE CONTROL: HYBRID AND CONSTRAINED STRUCTURE SYSTEMS Annual Technical Report, 1 May 1981 - 30 Apr. 1982
T. E. Djaferis and R. V. Monopoli 30 Jun. 1982 7 p refs
(Grant AF-AFOSR-0155-80; AF Proj. 2304)
(AD-A118534; AFOSR-82-0638TR; ATR-2) Avail: NTIS HC A02/MF A01 CSCL 12/1

Research results in Hybrid Model Reference Adaptive Control Systems (HMRACS) are reported. Two stable hybrid adaptive algorithms are given for gain adjustment with periodic or variable rate sampling. The hybrid approach holds promise for more robust designs in the presence of unmodelled dynamics. New pole assignment methods using dynamic output feedback are discussed that improve earlier results and which may in addition lead to simpler adaptive algorithms. Author (GRA)

N83-12919# Office of Technology Assessment, Washington, D.C.
IMPACT OF ADVANCED AIR TRANSPORT TECHNOLOGY.

PART 2: THE AIR CARGO SYSTEM, BACKGROUND PAPER
Jan. 1982 55 p refs
(PB82-186818; OTA-BR-T-10-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 01C

The economic, environmental, and societal impacts of advances in the technology of transport aircraft on the air cargo system is assessed. The role and importance of arcraft technology in the total air cargo system is put in perspective. The principal factors that could influence the future evolution of air cargo transport are discussed. GRA

N83-12920# Office of Technology Assessment, Washington, D.C.
IMPACT OF ADVANCED TRANSPORT TECHNOLOGY. PART 3: AIR SERVICE TO SMALL COMMUNITIES
Feb. 1982 49 p refs
(PB82-186800; OTA-T-170-Pt-3) Avail: NTIS HC A03/MF A01 CSCL 01C

An assessment of the impact of advances in air transport technology on commuter airlines operation is presented. Air service to small-and medium-size communities is presently undergoing a rapid and sometimes disruptive transition from a regulated environment to a deregulated, competitive market. Past Government regulation has affected not only the level of service to small communities, but also the aircraft that were (or were not) developed for this market by U.S. manufacturers. The future growth of computer airlines will ultimately depend on their ability to provide convenient and competitive service in short-haul markets.
Author (GRA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-12921# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF PROBLEMS OF ILL-CONDITIONED REGRESSION IN THE PRESENCE OF MULTICOLLINEARITY [ESTUDO DE PROBLEMAS DE REGRESSAO MALCONDICIO NADOS OU COM PRESENCA DE MULTICOLINEARIDADE]
L. A. N. Lorena and Jose Roberto Reis May 1982 16 p refs In PORTUGUESE; ENGLISH summary Presented at the 5th Natl. Symp. on Probability and Statist., Sao Paulo, Brazil, 26-30 Jul. 1982
(INPE-2401-PRE/115) Avail: NTIS HC A02/MF A01

An application of the ridge estimator to the selection of variables in the linear multiple regression model is presented. The concept of spectral condition number of the matrix associated to the system is used to relate the multicollinearity and ill-conditioned problems of the normal system of equations. An example of the estimation of demand for clothing is presented to compare this method with other traditional methods for the selection of variables. Author

N83-12922# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A NUMERICAL STUDY OF VERTICAL MODES OF A MODEL OF PRIMITIVE EQUATIONS [UM ESTUDO NUMERICO DOS MODOS VERTICAIS DE UM MODELO DE EQUACOES PRIMITIVAS]
Mary Toshie Kagano, Pedro Leite daSilva Dias, and Claudio Solano Pereira Mar. 1982 69 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of the Brazilian Soc. for the Progr. of Sci., Campinas, Brazil, Jul. 1982
(INPE-2364-PRE/097) Avail: NTIS HC A04/MF A01

Perturbation propagation in a stratified atmosphere was investigated using a bidimensional model of primitive equations. The model response to an initial perturbation in the temperature field was studied, using the leapfrog scheme stressing the vertical structure and velocity of energy propagation. Two series of experiments were conducted: INF (the perturbation is cumulatively inserted in each level starting from the surface) and SUP (analogous to INF series, but starting from the top). Most of energy in the 1 INF experiment is confined in the external mode, and in 3 INF, 5 INF, 7 INF and 9 INF experiments the energy is gradually confined to more internal modes. The SUP experiments present more uniform energy partition between external and internal modes (except in 7 SUP and 9 SUP experiments, most of energy is in the external mode). The phase velocities for the external and first internal modes were estimated. Author

N83-12923# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
INTERPOLATION METHODS FOR MULTISPECTRAL IMAGES [METODOS DE INTERPOLACAO PARA IMAGENS MULTIESPECTRAIS]
C. L. Mendes, Nelson D. A. Mascarenhas, and Ricardo C. M. deSouza Jun. 1982 37 p refs In PORTUGUESE; ENGLISH summary Presented at the 33rd Ann. Meeting of SBPC, Salvador, Brazil, 8-15 Jul. 1981
(INPE-2450-PRE/148) Avail: NTIS HC A03/MF A01

A comparison among several methods of image interpolation, under the points of view of both spatial and spectral characteristics is presented. The results of the application of these methods to the problem of scale change are presented. The error parameters of each enlarged image are measured. The evaluation, on the frequency domain, is made through the comparison of the resulting spectrum with the ideal one. Finally, an attempt is made to approximate the ideal interpolator on the frequency domain and the error parameters of the resulting images are measured. Author

N83-12924# Mathematisch Centrum, Amsterdam (Netherlands).
IDENTIFICATION AND INFORMATIVE SAMPLE SIZE
H. H. Tigelaar 1982 159 p refs
(Rept-147; ISBN-90-6196-235-8) Avail: NTIS HC A08/MF A01

Identifiability problems are discussed in relation to all kinds of statistical problems, particularly statistical prediction problems. Univariate stationary models and multivariate models are considered. Dynamic simultaneous equations with moving average errors are addressed. S.L.

N83-12925# Mathematisch Centrum, Amsterdam (Netherlands).
SEMIGROUP AND FACTORIZATION METHODS IN TRANSPORT THEORY
C. V. M. vanderMee 1981 182 p refs
(Math-Centre-Tract-146; ISBN-90-6196-233-1) Avail: NTIS HC A09/MF A01

Solution techniques for a one-dimensional integro-differential linear transport equation are discussed. The use of a semigroup method and Wiener-Hopf factorization to solve the finite-slab problem and the half space problem is described. M.G.

N83-12926# Mathematisch Centrum, Amsterdam (Netherlands).
THE SOLUTION OF INITIAL VALUE PROBLEMS USING INTERVAL ARITHMETIC. FORMULATION AND ANALYSIS OF AN ALGORITHM
P. Eijgenraam 1981 201 p refs
(Rept-144; ISBN-90-6196-230-7) Avail: NTIS HC A10/MF A01

Initial value problems are considered for systems of M ordinary differential equations, where $M > \text{or} = 1$. The problem of enclosing the solution numerically for arbitrary values of the independent variable t is addressed. The initial value is not exactly known, but is only known to be contained in a given initial value set. The corresponding set of solutions for arbitrary t is enclosed. All possible sources of errors, including rounding errors due to the finite precision of a computer are taken into account. A numerical method for solving the aforementioned problem is formulated. Author

N83-12927# Mathematisch Centrum, Amsterdam (Netherlands).
EDGEWORTH EXPANSIONS FOR LINEAR COMBINATIONS OF ORDER STATISTICS Ph.D. Thesis
R. Helmers 1982 152 p refs
(Math-Centre-Tract-105; ISBN-90-6196-174-2) Avail: NTIS HC A04/MF A01

The classical theory of Edgeworth expansions for sums of

independent random variables is surveyed. The theory is then extended to more general statistics. The rate of convergence to the normal limit distribution of the df's of linear combinations of order statistics is obtained. Edgeworth expansions for linear combinations of order statistics with smooth weight functions are presented. S.L.

N83-12928# Leiden Univ. (Netherlands).
MULTI-DIMENSIONAL CONTINUED FRACTION ALGORITHMS
A. J. Brentjes Amsterdam Mathematical Center 1981 196 p refs Sponsored in part by Netherlands Organization for the Advancement of Pure Research
(Rept-145; ISBN-90-6196-231-5) Avail: NTIS HC A09/MF A01

Multi-dimensional continued fraction algorithms and their application to Diophantine approximation problems are studied. The approach is more of a geometric nature than in most of the related literature. The ordinary continued fraction algorithm is considered. Multi-dimensional continued fraction algorithms are introduced. Vectorial algorithms are surveyed. Approximation problems are introduced. A continued fraction algorithm is constructed. Higher dimensions are considered. It is shown that chains of relative minima can be calculated by means of a two dimensional continued fraction algorithm. Author

N83-12929# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DIGITAL IMAGE INTERPOLATORS BY WINDOW METHODS [PROJECTO DE INERPOLADDORES EM IMAGENS DIGITAIS FOR MEIO DE METODOS DE JANELAMENTO]
Gilberto Camara Neto, Nelson Delfino DAvila Mascarenhas, and Celso Luiz Mendes Aug. 1982 59 p refs In PORTUGUESE; ENGLISH summary Presented at 34th Reuniao Ann. da SBPC, Carpinas, Brazil, 6-14 Jul. 1982
(INPE-2498-PRE/181) Avail: NTIS HC A04/MF A01

A new class of interpolators, obtained by the use of various windows, is presented. These interpolators were used in experiments of scale magnification; the results are shown, and the error parameters are presented for each magnified image. Author

N83-12930*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CONVERGENCE ACCELERATION OF VISCOUS FLOW COMPUTATIONS
Gary M. Johnson Oct. 1982 30 p refs
(NASA-TM-83039; E-1484; NAS 1.15:83039) Avail: NTIS HC A03/MF A01 CSCL 12A

A multiple-grid convergence acceleration technique introduced for application to the solution of the Euler equations by means of Lax-Wendroff algorithms is extended to treat compressible viscous flow. Computational results are presented for the solution of the thin-layer version of the Navier-Stokes equations using the explicit MacCormack algorithm, accelerated by a convective coarse-grid scheme. Extensions and generalizations are mentioned. M.G.

N83-12931# Stanford Univ., Calif. Dept. of Statistics.
MULTIDIMENSIONAL ADDITIVE SPLINE APPROXIMATION
Jerome H. Friedman, Werner Stuetzle, and Eric Grosse Jan. 1982 30 p refs
(Contracts DE-AC03-76SF-00515; DE-AT03-81ER-10843; N00014-81-K-0340; Grant NSF MCS-78-17697; Proj. ORION) (SU-ORION-006) Avail: NTIS HC A03/MF A01

An adaptive procedure is described that approximates a function of many variables by a sum of (univariate) spline functions s sub M of selected linear combinations a sub M times x of the coordinates PHI(X)=Sigma(1<or=M<or=M) s sub M(A sub M times x). The procedure is nonlinear in that not only the spline coefficients but also the linear combinations are optimized for the particular problem. The sample need not lie on a regular grid, and the approximation is affine invariant, smooth, and lends itself to graphical interpretation. Function values, derivatives, and integrals are inexpensive to evaluate. M.G.

N83-12932*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
METHOD OF AND APPARATUS FOR GENERATING AN INTERSTITIAL POINT IN A DATA STREAM HAVING AN EVEN NUMBER OF DATA POINTS Patent Application
Thomas R. Edwards, inventor (to NASA) Filed 29 Oct. 1982 26 p
(NASA-Case-MFS-25319-1; US-Patent-Appl-SN-437917) Avail: NTIS HC A02/MF A01 CSCL 12A

Apparatus for doubling the data density rate of an analog to digital converter or doubling the data density storage capacity of a memory device is described. An interstitial data point midway between adjacent data points in a data stream having an even number of equal interval data points is generated by applying a set of predetermined one dimensional convolute integer coefficients which can include a set of multipler coefficients and a normalizer coefficient. Interpolator means apply the coefficients to the data points by weighting equally on each side of the center of the even number of equal interval data points to obtain an interstitial point value at the center of the data points. NASA

N83-12933# Michigan Univ., Ann Arbor. Radiation Lab.
[ANALYTICAL AND NUMERICAL STUDY OF RESISTING SHEETS AND SCATTERING FROM PARTICLES] Annual Report, 1 Jan. - 31 Dec. 1981
Thomas B. A. Senior Dec. 1981 13 p refs
(Grant AF-AFOSR-3188-77; AF Proj. 2304)
(AD-A111240; Rept-015224-5-1; AFOSR-82-0058TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The two main themes of the work have been the analytical and numerical study of resistive sheets in various configurations, and the low frequency scattering from a number of different types of particles. In large measure the resistive sheet work is approaching a natural conclusion and our understanding of the scattering properties of sheets is now almost sufficient for the design of low cross section shapes incorporating them. For a resistive strip or ribbon it was earlier shown that the bistatic scattered field can be expressed in terms of the current induced in the corresponding half plane, and the resulting (uniform) high frequency asymptotic expression gives accurate results even for strip widths which are a small fraction of a wavelength. An efficient procedure for computing the half plane current for any (complex) resistivity has now been developed. Author (GRA)

N83-12934# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SOVIET MATHEMATICAL PROGRAMMING
J. L. Noyes 1982 33 p
(AD-A116970) Avail: NTIS HC A03/MF A01 CSCL 12/1

Soviet texts and journals were surveyed. Military applications are considered. N.W.

N83-12935# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A SURVEY OF MATHEMATICAL PROGRAMMING IN THE SOVIET UNION
17 Apr. 1980 38 p refs
(AD-A116969) Avail: NTIS HC A03/MF A01 CSCL 13/1

A bibliography with 400 entries from the translated abstracts of over 5000 Soviet articles and books on Mathematical Programming is presented. The Soviets pay attention to mathematical programming which is compatible with a philosophy of the maximum of resource optimization. The bibliography is very subjective and is arranged according to the accepted mathematical pogramming categories with survey of works which contain material in several categories grouped under the heading of mathematical programming (general). Theoretical works and applications such as military, scientific, economic and industrial are included. The citations reflect all known publication information and the material is alphabetized according to the first author of the reference. E.A.K.

N83-12936# Stanford Univ., Calif. Dept. of Computer Science.
AN ALGORITHM FOR REDUCING ACYCLIC HYPERGRAPHS

Gabriel M. Kuper Jan. 1982 11 p refs
(Grant AF-AFOSR-0212-80; AF Proj. 2304)
(AD-A118535; SU-STAN-CS-82-892; AFOSR-82-0646TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The report gives a description of an algorithm to compute efficiently the Graham reduction of an acyclic hypergraph with sacred nodes. To apply the algorithm we must already have a tree representation of the hypergraphs, and therefore it is useful when we have a fixed hypergraph and wish to compute Graham reductions many times, as we do in the System/U query interpretation algorithm. Author (GRA)

N83-12937# Wisconsin Univ., Madison. Mathematics Research Center.
APPROXIMATION ORDER FROM BIVARIATE C1-CUBICS: A COUNTER EXAMPLE
C. DeBoor and K. Hoellig Jun. 1982 14 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A118606; MRC-TSR-2389) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is shown that the space of bivariate C1 piecewise cubic functions on a hexagonal mesh of size h approximates to certain smooth functions only to within O(h3) even though it contains a local partition of every cubic polynomial. One measures the approximation power of a family S of piecewise polynomial approximating functions on some partition in terms of the meshsize h of that partition. Typically, the error of approximation goes to zero like hr as the meshsize goes to zero, with r depending on the smoothness of the function being approximated. There is a maximal r typical for the space S used, and faster convergence rates are possible only for very special functions. Naturally, one would like this optimal rate or approximation order hr to be as fast as possible, i.e., would like the maximal r to be as large as possible. In any case, it is an important practical question to ascertain, for a given approximating space S, what its optimal approximation order is. GRA

N83-12938# Wisconsin Univ., Madison. Mathematics Research Center.
SOME PROPERTIES OF VISCOSITY SOLUTIONS OF HAMILTON-JACOBI EQUATIONS
M. G. Crandall, L. C. Evans (Maryland Univ.), and P. L. Lions Jun. 1982 31 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-81-02846)
(AD-A118607; MRC-TSR-2390) Avail: NTIS HC A03/MF A01 CSCL 12/1

Recently M. G. Crandall and P. L. Lions introduced the notion of 'viscosity solutions' of scalar nonlinear first order partial differential equations. Viscosity solutions need not be differentiable anywhere and thus are not sensitive to the classical problem of the crossing of characteristics. The value of this concept is established by the fact that very general existence, uniqueness and continuous dependence results hold for viscosity solutions of many problems arising in fields of application. The notion of a 'viscosity solution' admits several equivalent formulations. Here we look more closely at two of these equivalent criteria and exhibit their virtues by both proving several new facts and reproving various known results in a simpler manner. Moreover, by forsaking technical generality we hereby provide a more congenial introduction to this subject than the original paper. Author (GRA)

N83-12939# Wisconsin Univ., Madison. Mathematics Research Center.
LOWER BOUNDS FOR THE LIFE SPAN OF SOLUTIONS OF NONLINEAR WAVE EQUATIONS IN THREE DIMENSIONS
Fritz John Jun. 1982 42 p refs
(Contracts N00014-76-C-0439; DAAG29-80-C-0041; Grant NSF MCS-79-00812)
(AD-A118599; MRC-TSR-2393) Avail: NTIS HC A03/MF A01 CSCL 12/1

Strict solutions of an equation u sub tt - the sum to 3 terms of (i,k=l)a sub ik (Du)u sub x(sub i)x(sub k)=O, where Du is the set of four first derivatives of u. For given initial values u(x,O) = epsilon F(x), u sub t (x,O) = epsilon F(x), u sub t (x,O) = epsilon G(x) the life span T(epsilon) is defined as the supremum of all t to which the local solution can be extended for all x. Blow-up in finite time corresponds to T(epsilon) < infinity. Examples show that this can occur for arbitrarily small epsilon. On the other hand T(epsilon) must at least be very large for small epsilon. Assuming that a sub ik, F, G belonging to the set C cup infinity, that a sub ik(O) = delta sub ik prime, and that F,G have compact support, it is shown that the limit of epsilon(N)T(epsilon) as epsilon approaches O = infinity for every N. Author

N83-12940# Wisconsin Univ., Madison. Mathematics Research Center.
THE SELECTION OF SMOOTHNESS PRIORS FOR DISTRIBUTED LAG ESTIMATION
Hirotugu Akaike (Inst. of Statistical Mathematics) Jun. 1982 17 p refs
(Contract DAAG29-80-C-0041)
(AD-A118598; MRC-TSR-2394) Avail: NTIS HC A02/MF A01 CSCL 12/1

In the application of Shiller's smoothness prior for distributed lag estimation the main difficulty is the selection of hyperparameters of the prior distribution. In this paper the use of a maximum likelihood procedure is proposed for this purpose and its performance is demonstrated by numerical examples. GRA

N83-12941# Florida Univ., Gainesville. Electronic Communications Lab.
ANALYSIS OF A FUNCTION TO APPROXIMATE THE ENVELOPE OF A BANDPASS RANDOM SIGNAL
Peyton Z. Peebles, Jr. Adelphi, Md. Harry Diamond Lab. 9 Mar. 1982 21 p refs
(Contract DAAK21-81-C-0116; DA Proj. 1L6-62616-AH-77)
(AD-A118460; HDL-CR-82-116-2) Avail: NTIS HC A02/MF A01 CSCL 09/5

A simple algorithm is analyzed for calculating the envelope of a bandpass random signal. A general formula for the probability density function of the computed envelope is given. A specific example is worked out in detail for the case of zero-mean Gaussian bandpass noise. Author (GRA)

N83-12942# Wisconsin Univ., Madison. Mathematics Research Center.
NONLINEAR GRAVITY-CAPILLARY STANDING WAVES IN WATER OF ARBITRARY UNIFORM DEPTH
Jean Marc VandenBroeck Jun. 1982 15 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A118597; MRC-TSR-2392) Avail: NTIS HC A02/MF A01 CSCL 12/1

Gravity-capillary standing waves in water of arbitrary uniform depth are considered. The classical perturbation calculation yields unbounded coefficients for some critical values of the depth. A perturbation solution valid at the first critical value of the depth is derived. It is found that two solutions exist at this critical value. Numerical computations indicate that these solutions are members of two different families of solutions. Graphs of the results are included. Author (GRA)

N83-12943# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
A TWO-STAGE ELIMINATION TYPE PROCEDURE FOR SELECTING THE LARGEST OF SEVERAL NORMAL MEANS WITH A COMMON UNKNOWN VARIANCE
Shanti S. Gupta and Woo-Chul Kim (Seoul National Univ.) Aug. 1982 34 p refs
(Contract N00014-75-C-0455; NR Proj. 042-243)
(AD-A118501; TR-82-27) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of selecting the normal population with the largest mean from several populations with common unknown variance is considered. A new simple two stage elimination type procedure is proposed which guarantees the same probability requirement using the indifference zone approach as does the two stage non elimination type procedure of Bechhofer, Dunnett and Sobel (1954).

The observations in the first stage are used not only to estimate the common unknown variance but also to screen out non contending populations. GRA

N83-12944# Tracor, Inc., Austin, Tex. System Modeling Dept.
HYBRID TRACKING ALGORITHM IMPROVEMENTS AND CLUSTER ANALYSIS METHODS Final Report, 1 Jan. 1981 - 26 Feb. 1982
Don Cooper, Glenn Corser, and Thomas Wilson 26 Feb. 1982 104 p refs
(Contract N00014-78-C-0670; NR Proj. 274-299; TRACOR Proj. 036-013)
(AD-A118470; TRACOR-T82-AU-9054-U) Avail: NTIS HC A06/MF A01 CSCL 15/4

This report details three areas of research undertaken during the past contractual year. First, detailed explanations are provided concerning the modifications made to Tracor's Hybrid Tracking Algorithm (HTA) to improve its overall tracking performance. Second, a summary is provided of Tracor's preliminary investigation into the use of cluster analysis techniques to sort data in the multi-target tracking problem. Finally, a description is provided of an experimental design technique known as response surface methodology. Author (GRA)

N83-12945# Sandia Labs., Livermore, Calif. Applied Mathematics Div.
AIM: THE ANALYTICALLY INTEGRATED MAGNUS METHOD FOR LINEAR AND SECOND ORDER SENSITIVITY COEFFICIENTS
Mark A. Kramer, J. M. Calo, Herschel Rabitz, and Robert J. Kee Aug. 1982 27 p refs Prepared in cooperation with Princeton Univ.
(Contract DE-AC04-76DP-00789)
(DE82-020887; SAND-82-8231) Avail: NTIS HC A03/MF A01

A computer code for sensitivity analysis of ordinary differential equations is described. The code, an implementation of the Analytically Integrated Magnus (AIM) method, can calculate both first- and second-order sensitivity coefficients. DOE

N83-12946# Illinois Univ., Urbana. Dept. of Computer Science.
DIFFERENTIAL/ALGEBRAIC SYSTEMS AND MATRIX PENCILS
C. W. Gear and L. B. Petzold Apr. 1982 28 p refs Presented at the Conf. on Matrix Pencils, Pitea (Sweden), 1 Mar. 1982
(Contract DE-AC02-76ER-02383)
(DE82-020138; UIUCDS-R-82-1086; COO-2383; UILU-ENG-82-1707; CONF-820388-1) Avail: NTIS HC A03/MF A01

The numerical solution of the differential/algebraic systems $F(t, y, y') = 0$ is studied. Many of these systems can be solved conveniently and economically using a range of ODE methods. Others can be solved only by a small subset of ODE methods, and still others present insurmountable difficulty for all current ODE methods. The important factor which determines the solvability of systems of linear problems is a quantity called the global nilpotency. This differs from the usual nilpotency for matrix pencils when the problem is time dependent, so that techniques based on matrix transformations are unlikely to be successful. DOE

N83-12947# California Univ., Livermore. Lawrence Livermore Lab.
IS THE TWO-TERM EXPANSION VALID FOR HIGHLY ANISOTROPIC SYSTEMS. THE TOWNSEND IONIZATION COEFFICIENT IN STRONG RUNAWAY AS A TEST CASE
S. S. Yu and R. E. Melendez 15 Jul. 1982 14 p refs
(Contract W-7405-eng-48; DARPA Order 4395)
(DE82-020362; UCID-19479) Avail: NTIS HC A02/MF A01

The Townsend ionization coefficient in the strong runaway regime was calculated within the framework of the two term expansion. Results are compared to the 1-D model. It is found that general features of the two models are qualitatively similar, however, quantitative differences by factors of approx. 2 are observed. DOE

N83-12948# Oak Ridge National Lab., Tenn. Computer Sciences Div.
SCREENING DESIGNS FOR RESPONSE SURFACE EXPERIMENTS
M. D. Morris Aug. 1982 17 p ref
(Contract W-7405-eng-26)
(DE82-020486; ORNL/CSD/TM-159) Avail: NTIS HC A02/MF A01

Screening experiments are discussed for the case in which the underlying model is a response surface polynomial of unknown degree. Systematic fractional replicate designs are discussed and extended for use in the response surface setting. A model selection strategy is outlined based on analysis of the design experiment. DOE

N83-12949# Bendix Corp., Kansas City, Mo.
PROPERTIES OF THE WILSON-FOWLER SPLINE
J. D. Emery Jul. 1982 82 p refs
(Contract DE-AC04-76DP-00613)
(DE82-020106; BDX-613-2810) Avail: NTIS HC A03/MF A01

The Wilson-Fowler spline, a piecewise cubic curve with continuous tangent and curvature, is described. The spline is used in numerical machining program. Information is given on existence, uniqueness, invariance properties, and gives some comparison with other spline types. FORTRAN subroutines are included. DOE

N83-12950# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
SOLVE: A NON LINEAR LEAST-SQUARES CODE AND ITS APPLICATION TO THE OPTIMAL PLACEMENT OF TORSATRON VERTICAL FIELD COILS
John Aspinall 25 May 1982 63 p refs
(Contract DE-AC02-78ET-51013)
(DE82-015605; PFC/RR-82-16; DOE/ET-51013/46) Avail: NTIS HC A04/MF A01

A computational method which alleviates the need for lengthy parametric scans as part of a design process is described. The method makes use of a least squares algorithm to find the optimal value of a parameter vector. Optimal is defined in terms of a utility function prescribed by the user. The placement of the vertical field coils of a torsatron is such a nonlinear problem. DOE

N83-12951# Sandia Labs., Albuquerque, N. Mex.
SMOOTHING THE EXTRAPOLATED MIDPOINT RULE
L. F. Shampine and L. S. Baca Jun. 1982 22 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018575; SAND-82-1319) Avail: NTIS HC A02/MF A01

An extrapolated semi-implicit midpoint rule for the solution of staff problems was studied. The method generalizes the explicit midpoint rule in a natural way. A smoothing scheme for the semi-implicit midpoint rule which resembles Gragg's scheme was invented. In contrast to the situation for nonstiff problems, this scheme is quite important for stiff problems. These schemes suggest a family of schemes for nonstiff problems which were explored. A way was proposed to exploit smoothing which will significantly increase the robustness of extrapolation codes. Finally the merits of the various smoothing schemes were considered as compared to each other and not to smoothing at all. DOE

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-12952# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
A RANDOMIZED SOLUTION FOR MULTI-BAYES ESTIMATES OF THE MULTINORMAL MEAN
D. J. deWaal, P. C. N. Groenewald, J. M. vanZyl, and J. V. Zidek (British Columbia Univ.) Oct. 1981 8 p ref Sponsored in part by CSIR
(TR-69) Avail: NTIS HC A02/MF A01

The randomized solution for the estimation of the multinormal mean by two or more Bayesians is addressed. The optimum rule is found by maximizing the Nash product in the case when randomization is necessary. M.G.

N83-12953# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
THE PREDICTION OF A FUTURE OBSERVATION BY MORE THAN ONE BAYESIAN
D. J. DeWaal Oct. 1981 10 p refs Sponsored in part by CSIR
(TR-68) Avail: NTIS HC A02/MF A01

The prediction of a future observation by more than one Bayesian is considered in a survival situation and the multinormal case. The pooling of the prior or posterior information of the Bayesians are done by the arithmetic mean of the prior (posterior) densities and by the geometric mean of the prior (posterior) densities. Using the arithmetic and the geometric means as methods of pooling, predictions are obtained that are weighted means of the predictions of each Bayesian where the weights differ according to the method of pooling used. M.G.

N83-12954# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
CONFIDENCE INTERVALS FOR A MULTIVARIATE NORMAL MEAN IN THE CASE OF EMPIRICAL BAYES ESTIMATION USING PEARSON CURVES AND NORMAL APPROXIMATIONS
A. J. vanderMerwe, P. C. N. Groenewald, D. G. Nel, and C. A. vanderMerwe Nov. 1981 26 p refs Sponsored in part by CSIR
(TR-70) Avail: NTIS HC A03/MF A01

More accurate confidence intervals for sample baseball data were obtained by using Pearson curves instead of the normal approximations. The theory and results for the Stein estimator for the vector case were also extended to that for the matrix case and confidence intervals were obtained. The unbiased risk estimator was also calculated. Author

N83-12955# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
ON A GENERALIZATION OF THE MATRIC-t DISTRIBUTION
D. G. Marx, D. J. DeWaal, P. C. N. Groenewald, and D. G. Nel Nov. 1981 16 p refs Sponsored in part by CSIR
(TR-71) Avail: NTIS HC A02/MF A01

A generalization of the matric-t variate's distribution and some of its properties which evolve from its density function are discussed. The main characteristics under consideration constitute the following: marginal and conditional distributions of submatrices of a matric-t variate, the inverted matric-t distribution, certain expected values of a matric-t variate, and the noncentral matric-t distribution. The current matrix normal approximation to the matric-t distribution is improved by means of the Kullback-Leibler divergence technique. M.G.

N83-12956# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
THREE-BAYESIAN ESTIMATION OF A MULTINORMAL MEAN: AN EXAMPLE
P. C. N. Gorenewald Nov. 1981 16 p refs Sponsored in part by CSIR
(TR-72) Avail: NTIS HC A02/MF A01

In the case of two Bayesians jointly trying to estimate the mean of a normal vector, the optimal Nash solution can be found. The problem is however largely unsolved for more than two Bayesians, mainly because the two dimensional solution relies heavily on geometrical properties which become complicated in higher dimensions. A relatively simple three dimension example is examined and solved with the view of obtaining some insight in the three-Bayesian problem and possibly a more general solution. Author

N83-12957# Orange Free State Univ., Bloemfontein (South Africa). Dept. of Mathematical Statistics.
ON PATTERNED MATRICES AND THEIR APPLICATIONS IN MULTIVARIATE STATISTICS
D. G. Nel Sep. 1981 20 p refs Sponsored in part by CSIR
(TR-67) Avail: NTIS HC A02/MF A01

The use of pattern, patterned, and transition matrices in multivariate analysis and particularly covariance structure analysis is discussed. Elementary symmetric functions of products of Kronecker products and transition matrices are derived and used to determine matrix divergences. A patterned matrix normal distribution is defined and used to derive the limiting covariance structure of a correlation matrix. M.G.

N83-12958# Stanford Univ., Calif. Dept. of Statistics.
SMOOTHING OF SCATTERPLOTS
Jerome H. Friedman and Werner Stuetzle Jul. 1982 50 p refs
(Contracts DE-AC03-76SF-00515; DE-AT03-81ER-10843; N00014-81-K-0340; DAAG-29-K-0056; Proj. ORION)
(ORION-003) Avail: NTIS HC 03/MF A01

A variable span scatterplot smoother based on local linear fits is described. Local cross-validation is used to estimate the optimal span as a function of abscissa value. A rejection rule is suggested to make the smoother resistant against outliers. Computationally efficient algorithms making use of updating formulas and corresponding FORTRAN subroutines are presented. M.G.

N83-12959*# Myers (Raymond H.), Blacksburg, Va.
A STUDY OF THE FEASIBILITY OF STATISTICAL ANALYSIS OF AIRPORT PERFORMANCE SIMULATION Final Report
Raymond H. Myers Washington NASA Nov. 1982 36 p refs Sponsored by NASA
(NASA-CR-3633; NAS 1.26:3633) Avail: NTIS HC A03/MF A01 CSCL 12A

The feasibility of conducting a statistical analysis of simulation experiments to study airport capacity is investigated. First, the form of the distribution of airport capacity is studied. Since the distribution is non-Gaussian, it is important to determine the effect of this distribution on standard analysis of variance techniques and power calculations. Next, power computations are made in order to determine how economic simulation experiments would be if they are designed to detect capacity changes from condition to condition. Many of the conclusions drawn are results of Monte-Carlo techniques. Author

N83-12960# Illinois Univ., Urbana. Coordinated Science Lab.
[MINIMAX LINEAR ESTIMATION AND CONTROL] Annual Progress Report, 1 Oct. 1980 - 30 Sep. 1981
H. Vincent Poor 20 Oct. 1981 132 p refs
(Contract N00014-81-K-0014)
(AD-A106983; TR-111) Avail: NTIS HC A07/MF A01 CSCL 12/1

This report includes several results in minimax linear estimation and control as well as results for general minimax hierarchical games and minimax jamming strategies. GRA

N83-12961# Purdue Univ., Lafayette, Ind. Dept. of Statistics.
ON ISOTONIC SELECTION RULES FOR BINOMIAL POPULATIONS BETTER THAN A STANDARD
Shanti S. Gupta and Wen-Tao Huang (Academia Sinica, Taipei) Jul. 1982 28 p refs
(Contract N00014-75-C-0455; NR Proj. 042-243)
(AD-A118548; TR-82-22) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of selecting populations better than a control with respect to a location parameter under ordering prior has been considered. In this paper we consider the case of binomial populations (important for discrete data) for which the parameters of interest are not the location parameters as was the case studied in 4. We consider both cases when the parameter of control is known and unknown. For the case of known control, we propose an isotonic procedure which is given. The results in this section deal with both cases, namely, the sample sizes all equal, and unequal. Some recursive relations are derived for computing the constants required for the proposed procedure. When the control is unknown, a conditional isotonic procedure is proposed. This procedure provides a conservative solution for the

unconditional procedure. Brief tables of associated constants for the proposed procedures are given. GRA

N83-12962# International Atomic Energy Agency, Seibersdorf (Austria).
NONPARAMETRIC STATISTICAL METHOD FOP DETERMINATION OF A CONFIDENCE INTERVAL FOR THE MEAN OF A SET OF RESULTS OBTAINED IN A LABORATORY INTERCOMPARISON
A. Veglia Aug. 1981 22 p refs
(DE81-701030; IAEA-RL-84) Avail: NTIS (US Sales Only) HC A02/MF A01; DOE Depository Libraries

In cases where sets of data are obviously not normally distributed, the application of a nonparametric method for the estimation of a confidence interval for the mean seems to be more suitable than some other methods because such a method requires few assumptions about the population of data. A two-step statistical method is proposed which can be applied to any set of analytical results: elimination of outliers by a nonparametric method based on Tchebycheff's inequality, and determination of a confidence interval for the mean by a non-parametric method based on binominal distribution. The method is appropriate only for samples of size n > = 10. DOE

N83-12963# Battelle Memorial Inst., Columbus, Ohio. Office of Nuclear Waste Isolation.
UNCERTAINTY ANALYSIS
Ralph E. Thomas Mar. 1982 67 p refs
(Contract DE-AC06-76RL-01830)
(DE82-020058; ONWI-380) Avail: NTIS HC A04/MF A01

An evaluation is made of the suitability of analytical and statistical sampling methods for making uncertainty analyses. The adjoint method is found to be well-suited for obtaining sensitivity coefficients for computer programs involving large numbers of equations and input parameters. For this purpose the Latin Hypercube Sampling method is found to be inferior to conventional experimental designs. The Latin hypercube method can be used to estimate output probability density functions, but requires supplementary rank transformations followed by stepwise regression to obtain uncertainty information on individual input parameters. A simple cork and bottle problem is used to illustrate the efficiency of the adjoint method relative to certain statistical sampling methods. For linear models of the form Ax=b it is shown that a complete adjoint sensitivity analysis can be made without formulating and solving the adjoint problem. This can be done either by using a special type of statistical sampling or by reformulating the primal problem and using suitable linear programing software. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-12964# Polish Academy of Sciences, Warsaw. Zaklad Ukladow Mechanicznych.
DIAGNOSTIC PROBLEMS WITH TECHNICAL SYSTEMS [PROBLEMY DIAGNOSTYKI SYSTEMOW TECHNICZNYCH.]
Waldemar Kurowski 1981 211 p refs In POLISH
(ISSN-0208-5658) Copyright. Avail: Issuing Activity

A concept of generalization is presented which may be diagnostically useful in evaluating mechanical systems. It is proposed that mechanical equipment and research procedures be treated as two subsystems of the diagnostic system. For the equipment subsystem, the cybernetic model is constructed and tested formally for diagnostic needs. Based on these results, a simplified model is proposed for duplicating the characteristics of mechanical equipment through observable phenomena. The aim is to link philosophical premises of the systems approach with practical investigations of mechanisms and machinery. M.G.

N83-12965# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SYSTEMS ENGINEERING: A PROJECT PLANNING AND CONTROL METHODOLOGY [ENGENHARIA DE SISTEMAS: UMA METODOLOGIA DE PLANEJAMENTO E CONTROLE DE PROJETOS]
Jose Roberto Reis Aug. 1982 10 p refs In PORTUGUESE; ENGLISH summary Presented at the 5th Semana de Engenharia de Sistemas, de Mogi das Cruzes, Brazil, 6 May 1982
(INPE-2496-PRE/179) Avail: NTIS HC A02/MF A01

The methodology of Systems Engineering used for planning and controlling projects is presented. Subjects discussed include: planning approach, the phases of the Systems Engineering process, planning techniques and the characterization of systems, and comments on the use of systems analysis as a decision process when various alternatives are confronted. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

No abstracts in this category.

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

No abstracts in this category.

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution*.

N83-12966*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CORRELATION OF CORE NOISE OBTAINED BY THREE SIGNAL COHERENCE TECHNIQUES
U. vonGlahn and E. Krejsa 1982 22 p refs Presented at the 104th Meeting of the Acoustical Soc. of Am., Orlando, Fla., 9-12 Nov. 1982
(NASA-TM-83012; E-1447; NAS 1.15:83012) Avail: NTIS HC A02/MF A01 CSCL 20A

The prediction of frequency content and noise levels of turbofan engine core noise is reexamined as a result of recent test data and a new diagnostic technique. The diagnostic technique, utilizing a three-signal coherence method, is used to obtain core noise spectra for several engines. Similarities and differences of the spectra are discussed. Finally, the three-signal coherence data are correlated, leading to an improved core noise prediction procedure. B.W.

N83-12967*# Texas Univ., Austin. Dept. of Mechanical Engineering.
HIGH-INTENSITY SOUND IN AIR SATURATED FIBROUS BULK POROUS MATERIALS Final Report, 1 Sep. 1978 - 31 Aug. 1981
Herbert L. Kuntz, II 3 Sep. 1982 255 p refs
(Contract NsG-3198)
(NASA-CR-167979; NAS 1.26:167979; ARL-TR-82-54) Avail: NTIS HC A12/MF A01 CSCL 20A

The interaction high-intensity sound with bulk porous materials in porous materials including Kevlar 29 is reported. The nonlinear behavior of the materials was described by dc flow resistivity tests.

Then acoustic propagation and reflection were measured and small signal broadband measurements of phase speed and attenuation were carried out. High-intensity tests were made with 1, 2, and 3 kHz tone bursts to measure harmonic generation and extra attenuation of the fundamental. Small signal standing wave tests measured impedence between 0.1 and 3.5 kHz. High level tests with single cycle tone bursts at 1 to 4 kHz show that impedance increases with intensity. A theoretical analysis is presented for high-porosity, rigid-frame, isothermal materials. One dimensional equations of motion are derived and solved by perturbation. The experiments show that there is excess attenuation of the fundamental component and in some cases a close approach to saturation. A separate theoretical model, developed to explain the excess attenuation, yields predictions that are in good agreement with the measurements. Impedance and attenuation at high intensities are modeled. A.R.H.

N83-12968*# Lockheed-Georgia Co., Marietta.
TONE-EXCITED JET: THEORY AND EXPERIMENTS Final Report
K. K. Ahuja, J. Lepicovsky, C. K. W. Tam (Florida State Univ., Tallahassee), P. J. Morris (Pennsylvania State Univ.), and R. H. Burrin Washington NASA Nov. 1982 244 p refs
(Contract NAS3-21987)
(NASA-CR-3538; NAS 1.26:3538; LG82ER0031) Avail: NTIS HC A11/MF A01 CSCL 20A

A detailed study to understand the phenomenon of broadband jet-noise amplification produced by upstream discrete-tone sound excitation has been carried out. This has been achieved by simultaneous acquisition of the acoustic, mean velocity, turbulence intensities, and instability-wave pressure data. A 5.08 cm diameter jet has been tested for this purpose under static and also flight-simulation conditions. An open-jet wind tunnel has been used to simulate the flight effects. Limited data on heated jets have also been obtained. To improve the physical understanding of the flow modifications brought about by the upstream discrete-tone excitation, ensemble-averaged schlieren photographs of the jets have also been taken. Parallel to the experimental study, a mathematical model of the processes that lead to broadband-noise amplification by upstream tones has been developed. Excitation of large-scale turbulence by upstream tones is first calculated. A model to predict the changes in small-scale turbulence is then developed. By numerically integrating the resultant set of equations, the enhanced small-scale turbulence distribution in a jet under various excitation conditions is obtained. The resulting changes in small-scale turbulence have been attributed to broadband amplification of jet noise. Excellent agreement has been found between the theory and the experiments. It has also shown that the relative velocity effects are the same for the excited and the unexcited jets. Author

N83-12969*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A DUAL DIFFERENTIAL INTERFEROMETER Patent Application
Richard O. Claus (Virginia Polytechnic Inst. and State Univ.) and Tyson M. Turner, inventors (to NASA) (Virginia Polytechnic Inst. and State Univ.) Filed 2 Sep. 1982 13 p Sponsored by NASA
(NASA-Case-LAR-12966-I; US-Patent-Appl-SN-414237) Avail: NTIS HC A02/MF A01 CSCL 20A

A dual differential interferometer that measures both the amplitude and orientation of propagating, broadband ultrasonic surface acoustic waves (SAWs) is described. The invention consists essentially of two pairs of beams from two dual beam interferometers. These four beams are focused on the SAWs to be measured in a crosshair configuration. The straight lines between each set of dual beams are perpendicular to each other. The reflected beams are separated into pairs and then detected to produce two signals x and y. The two signals are processed y signal processor to provide both the amplitude and orientation of propagation of the SAWs. Separation of the reflected beams is accomplished by polarizing one pair of beams differently from the other pair before they are focused on the SAWs. Then the two pairs of reflected beams are separated in accordance with their different polarizations. NASA

N83-12970# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
ULTRASONIC PULSE PROPAGATION IN CONSTANT-GROUP-VELOCITY MEDIA Interim Report, Mar. - Jul. 1982
Palmer L. Edwards 1 Jun. 1982 30 p refs
(ZR01301)
(AD-A118679; AD-F500058; NSWC/TR-82-296) Avail: NTIS HC A03/MF A01 CSCL 20/2

Results are presented of calculations made of distortion experienced by ultrasonic pulses in transmission through dispersive constant-group-velocity media, and the effects that it may have on velocity measurements. Three types of pulses were considered; a pulsed sine wave of constant amplitude, a pulsed sine wave with amplitude varying as sine-squared, and a rectangular pulse. It is shown that the individual waves in the pulsed sine waves move with the phase velocity of a continuous wave, and the envelope moves with the group velocity. It was also found that a pulsed sine wave in going a certain distance in a constant-group-velocity medium repeats itself, and midway between these distances is the negative of the values at the repetition distances. Because of this repetition phenomenon it is seen that the pulses do not spread as is normally the case in dispersive media. The envelopes of the propagated waves were also calculated, an in agreement with Brillouin's results (Wave Propagation and Group Velocity, Academic, New York, 1960) it was found that if the envelope contains negligible frequency components above the carrier frequency then the envelope is not distorted in passing through a dispersive constant-group-velocity medium. GRA

N83-12971# Solar Turbines International, San Diego, Calif. Turbomach Div.
DEVELOPMENT REPORT FOR THE 10 KW SOUND ATTENUATION PROGRAM (PREPRODUCTION F KIT) Final Report, Jan. 1977 - Dec. 1981
Gary L. Butzke 2 Dec. 1981 55 p
(Contract DAAK70-77-C-0032)
(AD-A118810; ERR-0195) Avail: NTIS HC A04/MF A01 CSCL 10/2

This final report covers the program undertaken to develop an acoustic enclosure for the 10 KW 60 Hz GTED Generator Set. The enclosure was designed to meet the performance requirements of category F of MIL-STD-1474. Tests were conducted to determine any detrimental effects of running the gas turbine engine inside of a closed environment. Tests were also conducted to determine the acoustical characteristics of the enclosed package and a comparison done with the standard 10 KW 60 Hz generator set to determine the attenuation provided by the acoustic enclosure. GRA

N83-12972# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.
A NOTE ON THE GENERAL SCALING OF HELICOPTER BLADE-VORTEX INTERACTION NOISE
F. H. Schmitz, D. A. Boxwell, S. Lewy (ONERA), and Claude Dahan (ONERA) May 1982 14 p refs Presented at the Ann. Forum of the Am. Helicopter Soc., Anaheim, Calif., May 1982
(AD-A118761) Avail: NTIS HC A02/MF A01 CSCL 20/1

A model-rotor acoustic experiment in a three meter open section anechoic wind tunnel (CEPRA-19) is described. The important scaling parameters are reviewed and some on-line acoustic data are presented for conditions known to produce blade-vortex interaction noise on a single rotor helicopter. Time averages of the model-scale acoustic pulses are compared with similar full-scale data taken in-flight under the same non-dimensionalized conditions. Good general agreement between model and full-scale pulse shapes and amplitudes of blade-vortex interaction noise is shown for one advance ratio over a range of inflow conditions for the rotor. Directivity sweeps for a condition known to generate blade-vortex interactions are presented. Some

model rotor testing limitations of the CEPRA-19 facility in its present configuration are indicated. Author (GRA)

N83-12973# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio. Biodynamics and Bioengineering Div.
USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK. VOLUME 172: HUSH-NOISE SUPPRESSOR (AERO SYSTEMS ENGINEERING, INCORPORATED) FAR-FIELD NOISE
Robert A. Lee, Thomas H. Rau, and Carolyn Jones Jul. 1982 823 p ref
(AF Proj. 7231)
(AD-A118773; AMRL-TR-75-50-Vol-172) Avail: NTIS HC A99/MF A01 CSCL 20/1

The hush-house noise suppressor was made by Aero Systems Engineering of Texas, Inc. for acoustical suppression of various AF fighter/trainer aircraft during ground runup operations. This report provides measured and extrapolated data defining the bioacoustic environments produced by several aircraft/engines operating in the hush-house suppressor for various engine power configurations. Far-field data measured at 20 locations are normalized to standard meteorological conditions and extrapolated from 75-8000 meters to derive sets of equal-value contours for seven acoustic measures as function of angle and distance from the source. Refer to Volume 1 of this handbook, 'USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application,' AMRL-TR-75(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Data are presented for the following aircraft/engines operating in the hush-house noise suppressor: F-4, F-15, F-16, F-105, F-106, F-111F and T-38 aircraft and the TF41-A-1, J79-GE-15, F100-PW-100, J75-P19, J-75-P-17 and TF30-P-100 engines. Author (GRA)

N83-12974# Army Construction Engineering Research Lab., Champaign, Ill. Environmental Div.
OPERATIONAL NOISE DATA FOR UH-60A AND CH-47C ARMY HELICOPTER Final Report
P. D. Schomer, Aaron Averbuch, and Richard Raspet Jun. 1982 46 p refs
(DA Proj. 4A7-62720-A-896)
(AD-A118796; CERL-TR-N-131) Avail: NTIS HC A03/MF A01 CSCL 20/1

The objectives of this study were to develop sound exposure level (SEL) versus distance curves for the UH -60A and CH-47C Army helicopters, to investigate the variation of SEL with aircraft speed, and to confirm the validity of the measurement procedures by comparing data obtained for UH-1H helicopters at Forts Campbell and Rucker. Sound levels produced by the helicopters were measured for heavily and lightly loaded aircraft which were hovering and traveling at various speeds and distances. The data show that a heavily loaded UH-60A is about 2 dB louder than a lightly loaded one. Landing noise with the UH-60A and CH-47 is substantially greater than for level flyover. The variation of SEL with speed is rather modest, except for aircraft at very low or very high speeds. The results for the UH-1H at Forts Campbell and Rucker did not compare as favorably as expected. Various factors, including maintenance procedures and the surface of the test area, may have contributed to the discrepancies.
Author (GRA)

N83-12975# Civil Aeronautics Board, Washington, D.C.
AREA EQUIVALENT METHOD: A QUICK PROCEDURE FOR DETERMINING NOISE IMPACT AT CIVILIAN AIRPORTS
Feb. 1982 92 p refs
(PB82-195892) Avail: NTIS HC A05/MF A01 CSCL 13B

A background of the Area Equivalent Method concept is given along with specific instructions in its use. The method is used as an analysis tool in determining noise impact at commercial airports. GRA

N83-12976# Association Aeronautique et Astronautique de France, Paris.
NOISE SOURCE MECHANISMS IN UNSTEADY FLOW
John E. Ffowcs Williams Nov. 1980 28 p refs Presented at the 7th Colloq. d'Acoustique Aeron., Lyon, 4-5 Nov. 1980
(PB82-203837; AAAF-NT-80-49; ISSN-0243-0177) Avail: NTIS HC A03/MF A01 CSCL 20A

Some noise units are described and their relevance to various audible sounds and to pseudosound is discussed. A definition is then made of both sound and sound sources, the two being defined as non-overlapping in space. Surface sources are incorporated within that definition by a formal mathematical step. Linear noise sources are described and some examples given with an indication of their strength and practical importance. In an unbounded perfect gas such linear sources arise only because of unsteady heating or by the acceleration of inhomogeneous fluid or by unsteady boundary conditions. Compact sources are described and the noise due to unsteady heating and the acceleration of hot flames is illustrated. Efficient compact monopoles are discussed as are the linear dipole sources that act on inhomogeneous matter in unsteady motion. GRA

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-12977# Kyoto Univ. (Japan). Inst. of Plasma Physics.
DIELECTRONIC RECOMBINATION OF HYDROGENIC IONS
T. Fujimoto, T. Kato (Japan Atomic Energy Research Inst.), and Y. Nakamura Nagoya, Japan Nagoya Univ. Aug. 1982 53 p refs Submitted for publication Sponsored by Nagoya Univ.
(IPPJ-AM-23) Avail: NTIS HC A04/MF A01

Various approximate formulas for total or overall dielectronic recombination rate coefficient are compared with detailed calculations for the case of recombination of hydrogenic ion to helium like ion. The limiting case of infinite nuclear charge and the effect of the finite plasma density are also discussed. S.L.

N83-12978# North Carolina State Univ., Raleigh. Dept. of Physics.
INTENSE RELATIVISTIC ELECTRON BEAM INVESTIGATIONS Final Report, 1 Oct. 1979 - 30 Sep. 1981
Wesley O. Doggett Sep. 1981 34 p refs
(Grant AF-AFOSR-0051-80; AF Proj. 2301)
(AD-A118664; AFOSR-82-0657TR) Avail: NTIS HC A03/MF A01 CSCL 20/7

Progress in the following areas of relativistic electron beam investigations is described: (1) collective ion acceleration experiments using relativistic electron beams and localized ion sources produced by thin films, filaments, puffed gases and vaporization of small diameter wires; and (2) electron beam quality studies experiments with the objective of obtaining 'cool' beams propagating in vacuum in an axial magnetic field with minimum energy spread for such applications as the free electron laser.
Author (GRA)

N83-12979# SRI International Corp., Menlo Park, Calif. Molecular Physics Lab.
THEORETICAL STUDY OF STATE-TO-STATE COLLISIONS Final Scientific Report, 1 May 1980 - 30 Apr. 1982
Christopher H. Becker, Roberta P. Saxon, and Albert P. Hickman 29 Jun. 1982 44 p refs
(Contract F49620-80-C-0064; AF Proj. 2301; SRI Proj. 1680)
(AD-A118586; SRI-MP-82-063; AFOSR-82-0668TR) Avail: NTIS HC A03/MF A01 CSCL 20/8

The probability of making transitions between specifically known molecular states in collisional processes has been investigated theoretically. Fully quantum mechanical close-coupled calculations of electronic-vibrational-translational energy exchange for model atom-diatomic potentials have been performed. The process of ion-pair formation was investigated in this work. Symmetric charge

exchange in diatomic ion-diatomic molecule collisions was also studied. Nonadiabatic collisions were studied by quasi-classical and quantum perturbation methods as well. Finally, scaling laws for collisions of atomic Rydberg states with atoms and molecules have been developed. Author (GRA)

N83-12980# Naval Research Lab., Washington, D. C.
INJECTION OF A HIGH CURRENT BEAM INTO A MODIFIED BETATRON ACCELERATOR Interim Report
C. A. Kapetanakos, P. A. Sprangle, and S. J. Marsh 25 Aug. 1982 16 p refs
(RR0110941)
(AD-A118581; NRL-MR-4835) Avail: NTIS HC A02/MF A01 CSCL 20/7

A method is proposed for injecting and trapping a high current, high energy, nonneutral electron beam into a modified betatron accelerator. The injection is substantially simplified as a result of the balancing of two effects that are prominent in high current beams. Author (GRA)

N83-12981# Mission Research Corp., Albuquerque, N. Mex.
FX-25 AND FX-100 PROPAGATION EXPERIMENTS Annual Report
C. A. Ekdahl, L. A. Wright, T. P. Hughes, B. B. Godfrey, and W. Bostick Jul. 1982 192 p refs
(Contract F49620-81-C-0016)
(AD-A118755; AMRC-R-391) Avail: NTIS HC A09/MF A01 CSCL 20/7

Initial measurements of the hose-stable propagation pressure window and the beam current density distribution have been made using the beam produced by the FX-100 accelerator (1.5 MeV, 40 kA, and 120-ns pulsewidth). Many of the diagnostics for these measurements were developed using the beam from the FX-25 accelerator (1.5 MeV, 23 kA, and 20-ns pulsewidth). The FX-100 was decommissioned in August 1981, and the propagation experiments will continue using the beam from an accelerator (VISHNU) presently under construction for this purpose. The VISHNU beam is designed to have the same kinetic energy and current as the FX-100 beam (1.5 MeV and 40 kA), but with a much shorter pulsewidth (approx. 26 ns). Therefore, the transition to VISHNU should not involve a lengthy delay in the program, because we will be able to establish the propagation pressure window and current distribution evolution based on our experience with the FX-100 beam. We present here a brief account of the experiments performed and results obtained in the first year of this research. Following this we give the particulars of the FX-100 experiments and results, and the technical specification of the VISHNU accelerator. Details of the FX-25 experiments are to be found in App. A. GRA

N83-12982# Chicago Univ., Ill. Dept. of Chemistry.
ROTATIONALLY MEDIATED SELECTIVE ADSORPTION AS A PROBE OF ISOTROPIC AND ANISOTROPIC MOLECULE. SURFACE INTERACTION POTENTIALS: HD(J)/AG(111) Interim Technical Report
Chien-Fan Uy, Charles S. Hogg, James P. Cowin (Toronto Univ., Ontario), K. Birgitta Whaley, John C. Light, and Steven J. Sibener Aug. 1982 44 p refs Submitted for publication
(Contract N00014-77-C-0240; NR Proj. 392-023)
(AD-A118789; TR-2) Avail: NTIS HC A03/MF A01 CSCL 20/8

Rotationally mediated selective adsorption scattering resonances are used to make an experimental and theoretical study of the laterally averaged interaction potential between HD and a weakly corrugated system, Ag(111). The experimentally observed resonances determine the vibrational levels of the HD/Ag(111) physisorption potential as a function of bound rotational state. These vibrational levels show J-dependent shifts due to the orientational anisotropy of the potential. Exact quantum scattering calculations using a full laterally averaged potential of the form V sub o(z,0) = v sub o (z) (1 + beta P sub 2 (cos theta)) have been carried out to obtain rotationally inelastic transition probabilities. Experimental and theoretical resonance energies are compared for two forms of v sub o(z), a Morse and a variable exponent potential, as a function of Beta, and are found to be very close to the first order perturbed energies of a free rotor in bound states of v sub o(z). Both potential forms give equally good fits to the data, yielding an optimum value of the asymmetry parameter, Beta approx. -0.05. The determination of Beta is relatively insensitive to small changes in the v sub o(z) well depth. Author (GRA)

N83-12983# Oak Ridge National Lab., Tenn. Solid State Div.
ENHANCED ION BACKSCATTERING NEAR 1800 SCATTERING ANGLES IN THE TWO-ATOM SCATTERING MODEL
Ordean S. Oen Aug. 1982 41 p refs
(Contract W-7405-eng-26)
(DE82-020475; ORNL-5909) Avail: NTIS HC A03/MF A01

An analytical two atom scattering model was developed to treat the discovery of the enhancement near 180 deg. of Rutherford backscattering yields from disordered solids. In contrast to conventional calculations of Rutherford backscattering that treat scattering from a single atom only (the backscattering atom), the present model includes the interaction of a second atom lying between the target surface and the backscattering atom. The projectile ion makes a glancing collision with this second atom both before and after it is backscattered. A weighted average is made over all possible positions of this second atom. The model predicts an enhancement effect whose physical origin arises from the tolerance of path for those ions whose ingoing and outgoing trajectories lie in the vicinity of the critical impact parameter. Results using Moliere scattering show how the yield enhancement depends on ion energy, backscattering depth, exit angle, scattering potential, atomic numbers of the projectile and target, and target density. In the model the critical impact parameter and critical angle play important roles. It is shown that these quantities depend on a single dimensionless parameter and formulas accurate to better than 1% are given. DOE

N83-12984# Oak Ridge National Lab., Tenn. Fusion Energy Div.
LONG-PULSE ION SOURCE FOR NEUTRAL-BEAM APPLICATIONS
C. C. Tsai, M. M. Menon, P. M. Ryan, D. E. Schechter, W. L. Stirling, and H. H. Haselton Nov. 1981 36 p refs
(Contract W-7405-eng-26)
(DE82-003521; ORNL/TM-7851) Avail: NTIS HC A03/MF A01

A rectangular ion source to produce 120-keV/25-A hydrogen ion beams for pulse durations up to 10 s was developed. It consists of a plasma generator with a rectangular arc chamber and an ion accelerator with rectangular grids. The plasma generator is a modified ducPIGatron type. The electron emitter used is either a LaB6 hollow cathode or a LM indirectly heated cathode. The ion accelerator, which has four (or three) rectangular grids with multiple circular apertures, is utilized to form high energy on beams above (or below) 80 keV. With substantial improvements in water cooling and mechanical stability, this ion accelerator is operated reliably to deliver long pulse ion beams with energies in excess of 100 keV and pulse lengths of many seconds. The results of measurements made on the power transmission efficiency, power density profile at the target, and grid loadings are elaborated. The important characteristics associated with this long pulse ion source are also presented. DOE

N83-12985# Science Research Council, Daresbury (England).
SEPARATED-CHANNEL STATIC-EXCHANGE CALCULATIONS OF THE PHOTOIONIZATION OF THE 1 PI(G) ORBITAL OF O2
J. J. Delaney, I. H. Hillier, and V. R. Saunders Oct. 1981 7 p refs
(PB82-187261; DL/SCI/P-306T) Avail: NTIS HC A02/MF A01 CSCL 07D

The photoionization cross section of the 1 pi(g) orbital of molecular oxygen is calculated. The separated channel static exchange approximations and a large, flexible Gaussian basis are used. GRA

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-12986*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

APPARATUS AND METHOD TO KEEP THE WALLS OF A FREE SPACE REACTOR FREE FROM DEPOSITS OF SOLID MATERIALS Patent Application

Kazuo A. Yamakawa (JPL, California Inst. of Tech., Pasadena) Filed 8 Sep. 1982 23 p

(Contract NAS7-100)

(NASA-Case-NPO-15851-1; US-Patent-Appl-SN-415879) Avail: NTIS HC A02/MF A01 CSCL 18K

An apparatus and method is described for keeping interior walls of a reaction vessel free of undesirable deposits of solid materials in gas-to-solid reactions. The apparatus includes a moveable cleaning head which is configured to be substantially complementary to the interior contour of the walls of the reaction vessel and which is disposed in close proximity to the walls. The head ejects a stream of gas with a relatively high velocity into a narrow space between the head and the walls, and in accordance with Bernoulli's principle the head is biased towards the walls by the pressure prevailing in the reaction vessel. The gas ejected from the head is of such composition that it does not participate significantly in the chemical reaction conducted in the reaction vessel. NASA

N83-12987# Argonne National Lab., Ill. Fusion Power Program.

RADIATION DAMAGE IN DIAGNOSTIC WINDOW MATERIALS FOR THE TFTR

William Primak Jul. 1981 107 p refs

(Contract W-31-109-eng-38)

(ANL-FFP-TM-146) Avail: NTIS HC A06/MF A01

Diagnostic window materials for the TFTR at the tank wall location are evaluated. Vitreous silica, crystal quartz, sapphire, zinc selenide, and several fluorides: lithium fluoride, magnesium fluoride, and calcium fluoride; and seal glasses are discussed. The effects of the neutrons will be minimal. The major problems arise from the high flux of ionizing radiation, mainly the soft X rays which are absorbed near the surface of the materials. Additionally, this large energy deposition causes a significant thermal pulse with attendant thermal stresses. It is thus desirable to protect the windows with cover slips where this is feasible or to reduce the incident radiation by mounting the windows on long pipes. S.L.

N83-12988# Los Alamos Scientific Lab., N. Mex.

SPACE NUCLEAR SAFETY AND FUELS PROGRAM Progress Report, Jul. 1981

S. E. Bronisz, comp. Jul. 1981 19 p refs

(Contract W-7405-eng-36)

(DE82-004687; LA-9087-PR) Avail: NTIS HC A02/MF A01

Studies related to the use of (Pu-238)O2 in radioisotope power systems carried out for DOE are discussed. Topics covered include impact tests of fueled clad, development of a light weight radioisotope heater unit, helium release, and environmental tests. DOE

N83-12989# World Meteorological Organization, Geneva (Switzerland).

METEOROLOGICAL AND HYDROLOGICAL ASPECTS OF SITING AND OPERATION OF NUCLEAR POWER PLANTS. VOLUME 2: HYDROLOGICAL ASPECTS

1981 139 p refs

(WMO-550-Vol-2; TN-170-Vol-2; ISBN-92-63-10550-2) Avail: NTIS MF A01; print copy available at WMO, Geneva

Problems encountered in planning, designing, operating and decommissioning nuclear power plants (NPP's) are discussed with emphasis on the role of water under normal operation and accident conditions is explained. The purpose and scope of hydrological and water resource investigations required for the solution of the problems are discussed. References to available investigation techniques are given. The problem of ensuring the required water supply is analyzed for both normal and emergency conditions. Protection against flooding is stressed. Problems of water quality management are examined in relation to thermal pollution and radioactive water borne effluents and radioactive substances that may indirectly reach bodies of water. Author (ESA)

74 OPTICS

Includes light phenomena.

N83-12990# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

A TELESCOPE FOR ULTRAVIOLET PHOTOMETRY [UM TLELSCOPIO PARA FOTOMETRIA ULTRAVIOLETA]

Kalvala Ramanuja Rao and Clovis Monteiro doEspiritoSanto Jun. 1982 29 p refs In PORTUGUESE; ENGLISH summary

(INPE-2439-Pre/140) Avail: NTIS HC A03/MF A01

A design of a 45 cm telescope to be flown on a stratospheric balloon to study Southern Hemisphere stars in ultraviolet radiation is presented. A Cassegrain and a Newtonian system are considered. The Cassegrain system consists of two parabolic mirrors and the Newtonian system is made of a parabolic mirror (primary) and a plane (secondary). Using the ray tracing method, the spot diagrams are constructed for both systems and the incident rays are considered along and away from the optical axis. Both systems present a good angular resolution. However, for the purpose of construction of the telescope at INPE, the aberrations produced in the Newtonian system alone have been calculated. Author

N83-12991*# National Aeronautics and Space Administration. Pasadena Office, Calif.

RANGING SYSTEM Patent Application

John M. McLauchlan (JPL, California Inst. of Tech., Pasadena), John Au Yeung (JPL, California Inst. of Tech. Pasadena), Eldred F. Tubbs (JPL, California Inst. of Tech., Pasadena), Willis C. Goss (JPL, California Inst. of Tech., Pasadena), and Demetri Psaltis (JPL, California Inst. of Tech., Pasadena) Filed 28 Sep. 1982 18 p

(NASA-Case-NPO-15865-1; US-Patent-Appl-SN-425202) Avail: NTIS HC A02/MF A01 CSCL 20F

An accurate, relatively simple system of rugged design, useful in industrial robotics, is described for measuring the distance to an object, with a second component of the light pulse that passes along a reference path of known length. The reference path can be changed in precise steps so that it has an equivalent length approximately equal to the path length of the light pulse component that is reflected from the object. The resulting small difference in path lengths can be precisely determined by directing the light pulse components into opposite ends of a detector formed of a material that emits a second harmonic light output at the locations where the opposite-going pulses pass simultaneously across one another. NASA

N83-12992*# National Aeronautics and Space Administration. Pasadena Office, Calif.

INTEGRATED OPTICS IN AN ELECTRICALLY SCANNED IMAGING FOURIER TRANSFORM SPECTROMETER Patent Application

James B. Breckinridge (JPL, California Inst. of Tech., Pasadena) and Fred G. OCallaghan (JPL, California Inst. of Tech., Pasadena) Filed 10 Jul. 1982 18 p

(Contract NAS7-100)

(NASA-Case-NPO-15844-1; US-Patent-Appl-SN-416443) Avail: NTIS HC A02/MF A01 CSCL 20F

An efficient, lightweight and stable, Fourier transform spectrometer was developed. The mechanical slide mechanism needed to

create a path difference was eliminated by the use of retro-reflecting mirrors in a monolithic interferometer assembly in which the mirrors are not at 90 degrees to the propagation vector of the radiation, but rather at a small angle. The resulting plane wave fronts create a double-sided inteferogram of the source irradiance distribution which is detected by a charge-coupled device image sensor array. The position of each CCD pixel in the array is an indication of the path difference between the two retro-reflecting mirrors in the monolithic optical structure. The Fourier transform of the signals generated by the image sensor provide the spectral irradiance distribution of the source. For imaging, the interferometer assembly scans the source of irradiation by moving the entire instrument, such as would occur if it was fixedly mounted to a moving platform, i.e., a spacecraft. During scanning, the entrace slot to the monolithic optical structure sends different pixels to corresponding interferograms detected by adjacent columns of pixels of the image sensor. NASA

N83-12993# Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
THEORETICAL STUDY OF NONLINEAR SURFACE AND INHOMOGENEOUS PROCESSES AND THEIR APPLICATIONS TO OPTICAL BISTABILITY Final Report, 1 Apr. 1980 - 15 Mar. 1982
Alexander Kaplan 13 May 1982 7 p refs
(Grant AF-AFOSR-0188-80; AF Proj. 2301)
(AD-A118653; AFOSR-82-0670TR) Avail: NTIS HC A02/MF A01 CSCL 20/6

Some fundamentally novel nonlinear optical devices were proposed and experimentally realized (in collaborative experiments with P.W. Smith, W.J. Thomlinson and J. Bjorkholm at Bell Laboratories). These results have been published in fourteen papers by the principal investigator (some of them in collaboration with researchers at Bell Laboratories, Holmdel, NJ, and Max-Planck-Institute fur Quantenoptick, Garching, Germany). The unified theory of plane-wave reflection and reflection at nonlinear interfaces was considered. Excitation of inhomogeneous traveling waves, which are peculiar features for negative nonlinearity, have been studied. It was shown analytically that in the case of limited (Gaussian) beam incidence, the nonlinear surface wave, observed in some recent computer simulations, is strictly forbidden, and an approximate theory of reflection in such a case has been developed. Author (GRA)

N83-12994# University of Southern California, Los Angeles. Intelligent Systems Group.
IMAGE UNDERSTANDING RESEARCH Final Technical Report, 1 Oct. 1981 - 28 Feb. 1982
Ramakant Nevatia, Gerard G. Medioni, Keith E. Price, Andres Huertas, and H. Y. Lee Wright-Patterson AFB, Ohio AFWAL Mar. 1982 82 p refs
(Contract F33615-80-C-1080; DARPA Order 3119)
(AD-A118738; AFWAL-TR-82-1111) Avail: NTIS HC A05/MF A01 CSCL 20/6

This report describes techniques for symbolic matching of aerial images with other images or maps. Aerial images contain natural features and also man-made 3-D structures. Techniques for scene segmentation and description for these matching tasks are presented. Author (GRA)

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N83-12995# Nagoya Univ. (Japan). Inst. of Plasma Physics.
ANALYSIS OF STABILIZATION EFFECT OF QUADRUPOLE FIELD ON THETA PINCH PLASMAS
Tsutomu Ishimura (Osaka Univ., Japan) Aug. 1982 7 p refs
(IPPJ-608) Avail: NTIS HC A02/MF A01

A stability analysis based on MHD approximation was done on the effect of quadrupole field to suppress the n = 2 rotational instability occurring in theta pinch plasmas. Applying the analysis to the results of the experiment on the suppression of the instability, the theoretical threshold of B sub S becomes as 0.05 T, while the experimental one is 0.06 T. S.L.

N83-12996# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SUFFICIENT STABILITY CONDITION FOR ALPHA-DRIVEN VELOCITY-SPACE MODES IN COMPRESSION TOKAMAK
K. Yamazaki and M. Okamoto Sep. 1982 24 p refs
(IPPJ-609) Avail: NTIS HC A02/MF A01

The conditions for isotropic velocity space stability in compression Tokamaks and the possibility of thermonuclear instabilties were examined. Magnetic compression heating may invert the velocity distribution of alpha particles, which leads to velocity-space instabilities. A sufficient stability conditon is derived for these modes in compression Tokamaks. High field high density compression scenarios like Zephyr satisfy the stability condition, while medium field high temperature compression scheme like FTR may cause exciting velocity space thermonuclear instabilities. E.A.K.

N83-12997# Nagoya Univ. (Japan). Inst. of Plasma Physics.
COMMENTS ON THERMAL RUNAWAY EXPERIMENTS IN SUB-IGNITION TOKAMAKS
K. Yamazaki Sep. 1982 15 p refs
(IPPJ-610) Avail: NTIS HC A02/MF A01

The rough conditions for thermal runaway due to alpha particle heating to justify deuterium-tritium (D-T) operation of medium sized Tokamaks are examined. Justification of D-T operations from the physics viewpoint is discussed. Optimal thermal runaway experiments in high field, high density compact Tokamaks are suggested within the minimization of the induced radioactivation. E.A.K.

N83-12998*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANISOTROPY IN MHD TURBULENCE DUE TO A MEAN MAGNETIC FIELD
J. V. Shebalin, W. H. Matthaeus, and D. Montgomery Sep. 1982 43 p refs
(NASA-TM-84000; NAS 1.15:84000) Avail: NTIS HC A03/MF A01 CSCL 20I

The development of anisotropy in an initially isotropic spectrum is studied numerically for two-dimensional magnetohydrodynamic turbulence. The anisotropy develops due to the combined effects of an externally imposed dc magnetic field and viscous and resistive dissipation at high wave numbers. The effect is most pronounced at high mechanical and magnetic Reynolds numbers. The anisotropy is greater at the higher wave numbers. Author

N83-12999# Naval Research Lab., Washington, D. C.
HIGH POWER MICROWAVE ENERGY COUPLING TO NITROGEN DURING BREAKDOWN Interim Report
W. Michael Bollen, C. L. Yee, A. W. Ali, Mark J. Nagurney, and Michael E. Read 10 Aug. 1982 25 p refs
(SF68344601)
(AD-A118520; NRL-MR-4865) Avail: NTIS HC A02/MF A01 CSCL 20/9

Microwave energy coupling to nitrogen for breakdown conditions have been investigated. The experiments were performed in 25 Torr nitrogen using a 35k GHz 1 microseconds microwave pulse focused to 33 kW/squared cm. The plasma created during breakdown was observed to travel towards the source with a velocity of 4.6 x 10 to the 6th power cm/s. Spectroscopic measurements using a nitrogen helium mixture indicate the average electron density over a 2 cm chord to be 4.4 x 10 to the 12th power/cc and the electron temperature to be 3.8 eV. GRA

N83-13000# Tennessee Univ., Knoxville. Plasma Science Lab.
THE DESIGN, ASSEMBLY AND OPERATION OF AN ELECTRIC FIELD DOMINATED PLASMA FACILITY Interim Scientific Report, 15 Mar. - 30 Jun. 1982
J. Reece Roth 20 Jul. 1982 104 p refs

(Grant AF-AFOSR-0093-82; AF Proj. 2301)
(AD-A118557; PSL-82-2; AFOSR-82-0635TR) Avail: NTIS HC A06/MF A01 CSCL 20/9

This interim report summarizes accomplishments supported by AFOSR Contract No. 81-0093 during the period March 15, 1981 to June 30, 1982. During this initial phase of the contract, an electric field dominated plasma facility was designed, assembled, and put into operation. It consists of a steady state Penning discharge operating in a water-cooled magnet system which is capable of up to 0.4 Tesla. The high voltage power supply, magnet system, cooling water, and vacuum system have been assembled, and the first plasma was achieved. Diagnostic systems which have been put into operation thus far include spectrum analyzers to examine RF emissions to 28 GHz and a retarding potential energy analyzer. The plasma has operated for hours at a time, has exhibited a broad-band RF white-noise spectrum over frequencies from 0.5 MHz to 1.0 GHz; has produced ions with characteristic energies along the field lines of several hundred electron volts; and has exhibited evidence of strong parallel electric fields in the plasma. This plasma promises to be a rich source of information and data on physical processes in electric field dominated plasmas. Author (GRA)

N83-13001# California Univ., Livermore. Lawrence Livermore Lab.

PLASMA PARAMETER MEASUREMENTS USING NEUTRAL-PARTICLE-BEAM ATTENUATION

J. H. Foote, A. W. Molvik, and W. C. Turner 7 Jul. 1982 48 p refs
(Contract W-7405-eng-48)
(DE82-021120; UCID-19422) Avail: NTIS HC A03/MF A01

Intense and energetic neutral particle beam injection used for fueling or heating magnetically confined, controlled fusion experimental plasmas which make diagnostic measurements of the plasmas are discussed. The attenuation of an atomic beam when passing through a plasma gives the plasma line density. Orthogonal arrays of highly collimated detectors of the secondary electron emission type are used in magnetic mirror experiments to measure neutral beam attenuation along chords through the plasma volume at different radial and axial positions. The radial array is used to infer the radial plasma density profile; the axial array, to infer the axial plasma density profile and the ion angular distribution at the plasma midplane. DOE

N83-13002# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

REDUCTION OF RADIAL LOSSES IN TANDEM MIRRORS

J. R. Myra, D. A. Dippolito, and Peter J. Catto Jul. 1982 40 p refs
(Contract DE-AC03-76ET-53057)
(DE82-020276; SAI-254-84-174-LJ; PRI-44) Avail: NTIS HC A03/MF A01

The conditions for omnigenous magnetic fields are generalized to determine the fields which give the smallest mean square neoclassical step size consistent with given boundary conditions and constraints. This transport minimization produces less restrictive field configurations than omnigenity, and a wider class of practical applications is possible. An explicit set of ordinary differential equations is obtained for the transport minimizing vacuum fields in long thin tandem mirror geometry. The constraint, for these configurations no parallel current flows into the center cell (due to the Stupakov effect), is imposed naturally. DOE

N83-13003# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.

REDUCTION OF NEOCLASSICAL LOSSES IN MAGNETIC-CONFINEMENT DEVICES

J. R. Myra, D. A. Dippolito, and Peter J. Catto Jul. 1982 12 p refs
(Contract DE-AC03-76ET-53057)
(DE82-020277; SAI-254-82-219-LJ; PRI-46) Avail: NTIS HC A02/MF A01

Transport and direct radial losses result from the departure of particle drift surfaces from magnetic flux (constant pressure) surfaces. In order for a device to have the most favorable neoclassical particle confinement, it is desirable that the drift and flux surfaces remain as close as possible everywhere along the magnetic field. A technique is presented which minimizes this departure by the appropriate modification of the magnetic field geometry. The method is illustrated by determining the optimized fanning for specified mirror magnetic field profiles. DOE

N83-13004# California Univ., Livermore. Lawrence Livermore Lab.

EXPERIMENTAL OBSERVATIONS AND MODEL CALCULATIONS OF IMPURITY RADIATION IN A PLASMA GUN COMPACT TORUS EXPERIMENT

G. C. Goldenbaum (Maryland Univ.), E. H. A. Granneman (FOM Inst. of Atomic and Molecular Physics, Amsterdam), C. W. Hartman, D. S. Prono, J. Taska, and W. C. Turner 10 Aug. 1982 33 p refs
(Contract W-7405-eng-48)
(DE82-020365; UCID-19478) Avail: NTIS HC A03/MF A01

Several types of radiation measurements were performed on the Beta II compact forms experiment. Among these are time integrated spectra ranging in wavelength from the vuv to the UV, time resolved bolometer measurements of radiation from the X-ray to the infrared, and time and wavelength resolved measurements of certain spectral lines. It is difficult to relate any one of these measurements to plasma parameters of interest such as temperature, density, or impurity content. Results are compared of these, and other measurements with two simple models of the power balance in the plasma in order to estimate the effect of carbon and oxygen impurities on plasma lifetime. DOE

N83-13005# Tennessee Univ. Space Inst., Tullahoma. Energy Research and Development Center.

THREE-DIMENSIONAL CURRENT DISTRIBUTION IN COAL-FIRED MHD CHANNELS

M. Ishikawa, Y. C. L. Wu, and M. H. Scott Jan. 1982 64 p refs
(Contract DE-AC02-79ET-10815)
(DE82-016958; UTSI-81-6; DOE/ET-10015/70) Avail: NTIS HC A04/MF A01

Slagging effects on theoetical three dimensional current and potential distributions are presented for one frame of the UTSI 600DCW channel. The electrodynamic problem is solved with imposed gasdynamic and slag layer solutions. A three dimensional finite element method was applied to solve for the electrical potential. The location of current concentration calculated on anode sidebar wall coincides with wear patterns observed in experiments. The upper bound of slag layer leakage resistance was calculated. The effects of slag polarization on electrodes and the sidewall configuration on generator performance were investigated. Experimental data reveals that the polarization effect reduces about three percent of the overall electrical performance of the UTSI 600 Diagonal Conducting Wal (DCW) channel. The polarization effect results in a large change of the potential and current distributions near the frame but has a small effect on the overall electrical performance. Alternate sidewall/electrode configurations are considered analytically. DOE

N83-13006# Oak Ridge National Lab., Tenn. Fusion Energy Div.

COMPUTATIONAL METHODS IN TOKAMAK TRANSPORT

W. A. Houlberg, S. E. Attenberger, and L. L. Lao Jun. 1982 36 p refs
(Contract W-7405-eng-26)
(DE82-016616) Avail: NTIS HC A03/MF A01

A variety of numerical methods for solving the time dependent fluid transport equations for Tokamak plasmas is presented. Among the problems discussed are techniques for solving the sometimes very stiff parabolic equations for particle and energy flow, treating convection-dominated energy transport that leads to large cell Reynolds numbers, optimizing the flow of a code to reduce the time spent updating the particle and energy source terms, coupling the one dimensional flux-surface-averaged fluid transport equa-

tions to solutions of the 2-D Grad-Shafranov equation for the plasma geometry, handling extremely fast transient problems such as internal MHD disruptions and pellet injection, and processing the output to summarize the physics parameters over the potential operating regime for reactors. Emphasis is placed on computational efficiency in both computer time and storage requirements. DOE

N83-13007# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
LOWER-HYBRID-HEATING EXPERIMENTS ON THE ALCATOR C AND THE VERSATOR II TOKAMAKS
M. Porkolab, J. J. Schuss, Y. Takase, S. Texter, C. L. Fiore, R. Gandy, M. J. Greenwald, D. A. Gwinn, B. Lipschultz, E. S. Marmar et al 1982 15 p refs Presented at the 3rd Intern. Symp. on Heating in Toroidal Devices, Grenoble, France, 22 Mar. 1982
(Contract DE-AC02-78ET-51013)
(DE82-013674; DOE/ET-51013/41; PFC/CP-82-5; CONF-820345-10) Avail: NTIS HC A02/MF A01

Initial results from lower hybrid wave heating experiments carried out on the MIT Alcator-C and Versator II Tokamak are reported. In the Alcator-C experiments a 4 waveguide array, with internally brazed ceramic windows was used to inject 160 kW of microwave power at 4.6 GHz into the plasma with nO less than or equal to 1 x 10(15) cm(+3), and BO less than or equal to 12 T. The RF coupling studies show optimal coupling when the local density at the waveguide mouth is 25 to 50 times overdense. Heating experiments show an ion tail formation in hydrogen discharge peaking at a density of anti-n approx. = 2.7 x 10(14) cm(+3) at B = 8.9 T, and bulk ion heating at a density of anti n approx. = 1.5 x 10(14) c(+3) at B approx. = 11 T. Evidence of RF current enhancement has been observed at a density of n approx. = 3 x 10(13) cm (+3). Doppler broadening of the OVII and NVI lines shows a (RADICAL)T/sub i/= 50 eV rise in the bulk ion temperature. A significant RF produced ion tail is also observed by charge exchange analysis. A toroidal ray tracing code and a 1-D transport code to study the heating density bands and heating efficiencies were successfully combined. DOE

N83-13008# Sandia Labs., Albuquerque, N. Mex. Fusion Energy Div.
FUSION ENERGY DIVISION AUTOMATION OF THE ISX-B NEUTRAL BEAMS
S. C. Bates and P. C. Hanna Jun. 1982 21 p refs
(Contract W-7405-eng-26)
(DE82-016369; ORNL/TM-8279) Avail: NTIS HC A02/MF A01

Operation of the two neutral beams on the ISX-B Tokamak was fully automated for an injected power up to 2 MW. A PDP 11/34 FORTRAN program conditions and injects the beams using commercial CAMAC hardware and ad hoc modifications of the beam controls. The fundamental beam conditioning algorithm is based on the breakdown history of the source. Difficulties encountered were noise entering the CAMAC through control and data lines and the lack of well-defined operating heuristics detailed problem diagnostic techniques. A brief description is given of the hardware and software systems, operating techniques, and items of special concern. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-13009*# Case Western Reserve Univ., Cleveland, Ohio.
ORIENTATION DEPENDENCE OF THE STRESS RUPTURE PROPERTIES OF NICKEL-BASE SUPERALLOY SINGLE CRYSTALS Contractor Report, Jun. 1979 - Jun. 1981
Rebecca A. MacKay May 1981 97 p refs
(Contract NsG-3246)
(NASA-CR-165394; NAS 1.26:165394) Avail: NTIS HC A05/MF A01 CSCL 20L

The influence of orientation of the stress rupture behavior of Mar-M247 single crystals was studied. Stress rupture tests were performed at 724 MPa and 774 C where the effect of anisotropy is prominent. The mechanical behavior of the single crystals was rationalized on the basis of the Schmid factors for the operative slip systems and the lattice rotations which the crystals underwent during deformation. The stress rupture lives were found to be greatly influenced by the lattice rotations required to produce intersecting slip, because steady-state creep does not begin until after the onset of intersecting slip. Crystals which required large rotations to become oriented for intersecting slip exhibited a large primary creep strain, a large effective stress level at the onset of steady-state creep, and consequently a short stress rupture life. A unified analysis was attained for the stress rupture behavior of the Mar-M247 single crystals tested in this study at 774 C and that of the Mar-M200 single crystals tested in a prior study at 760 C. In this analysis, the standard [001]-[011]-[111] stereographic triangle was divided into several regions of crystallographic orientation which were rank ordered according to stress rupture life for this temperature regime. This plot indicates that those crystals having orientations within about 25 deg of the [001] exhibited significantly longer lives when their orientations were closer to the [001]-[011] boundary of the stereographic triangle than to the [001]-[111] boundary. B.W.

N83-13010# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ELECTRICAL RESISTIVITY OF LOW ENERGY IMPLANTATIONS OF P IN SI M.S. Thesis [RESISTIVIDADE ELECTRICA EM IMPANTACOES DE BSIXA ENERGIA DE P NO SI]
Enzo Granato Aug. 1982 81 p refs In PORTUGUESE; ENGLISH summary
(INPE-2516-TDL/09) Avail: NTIS HC A05/MF A01

The electrical behavior of P implanted layer on p-Si (12 keV implantation energy) for 6 doses varying from 10 to the 12th power to 10 to the 16th power was investigated. The electrical properties were examined through sheet resistivity measurements as a function of temperature between 300 and 4,2 K. The depth distribution of density and mobility of carriers was obtained through sheet Hall coefficient and resistivity measurements following successive removals of thin layers of the implantation by anodic oxidation. S.L.

N83-13011# Texas Univ., Arlington. Dept. of Physics.
MAGNETIC PHASE TRANSITIONS AND GROUND STATE PROPERTIES OF MAGNETIC CRYSTALS Final Report, 1 Oct. 1980 - 31 Mar. 1982
John L. Fry and Nathan E. Brener 28 Jun. 1982 5 p refs
(Grant AF-AFOSR-2981-76; AF Proj. 2301)
(AD-A118842; AFOSR-82-0658TR) Avail: NTIS HC A02/MF A01 CSCL 20/2

Further studies were made of transition metal magnets. A comprehensive treatment of chromium was concluded which gave a thorough understanding of ground state properties, including the spin density wave magnetism. Other studies included tests of new theoretical expressions for the magnetic susceptibility and new numerical procedures to evaluate the susceptibility including contributions of orbital motion of electrons in an applied field. GRA

N83-13012# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.
THE CORRELATION OF NITROCELLULOSE PROPERTIES AND CELLULOSE FEEDSTOCK CRYSTAL STRUCTURE Final Report, 1980 - 1982
H. J. Prask and C. S. Choi Jul. 1982 51 p refs
(AD-A118677; AD-E400878; ARLCD-TR-82011) Avail: NTIS HC A04/MF A01 CSCL 19/1

Studies of cellulose crystallinity are reviewed. The total-profile analysis method has been applied to X-ray diffraction data for celluloses from linter and woodpulp sources. Good agreement is obtained with published structure factors and lattice parameters from fiber studies, if a distinct amorphous profile is included in

our analysis. Correlations between cellulose and nitrocellulose properties and the measured cellulose crystallographic parameters are indicated. GRA

N83-13013# Spire Corp., Bedford, Mass.
HgCdTe FABRICATION USING DIRECTED ENERGY TECHNIQUES Semiannual Technical Report, 5 Apr. - 30 Jun. 1982
Anton C. Greenwald and Robert G. Wolfson Jul. 1982 43 p
Prepared in cooperation with New England Research Center, Inc., Sudbury, Mass.
(Contract MDA903-81-C-0410; ARPA Order 3800)
(AD-A118654; SAR-82-10082-02) Avail: NTIS HC A03/MF A01 CSCL 20/2

The goal of this research is to produce large-area, thin-film, single-crystal HgCdTe material for infrared detectors. This report describes initial results for the evaporation of CdTe onto insulating crystalline substrates (hot wall epitaxy), improvement of the surface morphology by pulsed electron-beam processing, and conversion to HgCdTe by evaporation and diffusion at constant temperature. Improvement in quality over past results and an increase in sample size to 2 inch diameter is expected with upgraded equipment described herein. Author (GRA)

N83-13014# Hughes Research Labs., Malibu, Calif.
GaAs SURFACE PASSIVATION FOR DEVICE APPLICATIONS Interim Report, 15 Jun. 1980 - 14 Dec. 1980
C. L. Anderson and M. D. Clark Wright-Patterson AFB, Ohio AFWAL Jul. 1982 42 p refs
(Contract F33615-78-C-1444; AF Proj. 2305)
(AD-A118777; AFWAL-TR-82-1088; IR-5) Avail: NTIS HC A03/MF A01 CSCL 20/12

This report describes the progress in the fifth six-month period of a program to develop deposited dielectrics for GaAs device applications. Three applications of the dielectrics have been investigated on this program: (1) isolation of control electrodes, (2) passivation of the GaAs surface, and (3) encapsulation of completed circuits. The dielectrics studied have included silicon oxynitride and mixtures of silicon nitride with germanium nitride. During this reporting period the activities performed emphasized a parametric study of plasma-enhanced deposition (PED) of silicon nitride. The overall process involves cleaning of the sample, anodic oxidation of the GaAs surface, stripping of the anodic oxide, an optional final wet-chemical surface preparation step, pre-deposition plasma-enhanced treatment of the walls of the deposition system or 'preburn' (which may involve a concurrent sample surface treatment), optional plasma etching of the sample surface, and deposition of the dielectric. We have analyzed the effects of variations in (1) oxide stripping and final wet-chemical preparation procedures, (2) preburn, (3) plasma etches, and (4) deposition procedures on the electrical properties of the GaAs/silicon nitride interface. None of the procedures investigated yielded interfaces useful for fabrication of practical GaAs insulated-gate transistors or integrated circuits. In addition, we have performed preliminary studies to determine appropriate parameters for the plasma-enhanced deposition of germanium nitride and mixtures of silicon nitride with germanium nitride. Author (GRA)

N83-13015# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SOLID STATE RESEARCH, 1982-1 Quarterly Technical Summary Report, 1 Nov. 1981 - 31 Jan. 1982
Alan L. McWhorter 15 Feb. 1982 122 p refs
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A118847; ESD-TR-82-010) Avail: NTIS HC A06/MF A01 CSCL 09/5

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 November 1981 through 31 January 1982. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. GRA

N83-13016# Naval Research Lab., Washington, D. C.
A COMPILATION OF ELECTRONIC ENERGY EIGENVALUES AND DENSITIES OF STATES OF Si, Ge, GaAs, ZnS, AND ZnSe Interim Report
C. S. Wang (Maryland Univ., College Park) and B. M. Klein 31 Aug. 1982 58 p
(RR0210201)
(AD-A118845; NRL-MR-4482) Avail: NTIS HC A08/MF A01 CSCL 20/8

Document presents a tabulation of energy eigenvalues and densities of states for the semiconductors, silicon, germanium, gallium phosphide, gallium arsenide zinc sulfide and zinc selenide. These theoretical results follow from self-consistent linear combination of Gaussian orbitals calculations for these materials. GRA

N83-13017# Brown Univ., Providence, R. I. Dept. of Chemistry.
THE DEPENDENCE OF MAGNETIC PROPERTIES ON STRUCTURE IN THE SYSTEM Fe2Ge(X)Si(1-x)04
M. Tellefsen, R. Kershaw, K. Dwight, and A. Wold 20 Aug. 1982 28 p refs Submitted for publication
(Contract N00014-77-C-0387; NR Proj. 359-653)
(AD-A118467; TR-21) Avail: NTIS HC A03/MF A01 CSCL 20/12

Members of the system Fe2Ge sub x Si sub (1-x)O4 were prepared and their magnetic susceptibilities were measured. The mu sub cff values for all compositions were consistent with high-spin Fe(2+)(3d(6)). The olivine Fe2SiO4 and the spinel Fe2GeO4 showed theta values of -87(1)K and -32(1)K, respectively. At ambient pressure, up to 20 mole percent of germanium could be substituted for silicon in the olivine Fe2SiO4, and the value for theta remained very close to that of pure Fe2SiO4. When the nominal composition Fe2GeO.3 SiO.7O4 was pressed at 50 kb, the resulting product was predominantly a spinel phase. The magnetic properties for each composition crystallizing with the olivine structure were found to be consistent with the presence of strong antiferromagnetic about 120 deg B-O-B nearest-neighbor interactions. Both the spinel and the olivine structures have weaker about 90 deg B-O-B interactions. Author (GRA)

N83-13018# North Carolina State Univ., Raleigh. Dept. of Materials Engineering.
SINGLE CRYSTAL EPITAXY AND CHARACTERIZATION OF BETA-SiC Final Technical Report, 1 Jan. - 31 Dec. 1981
R. F. Davis Jul. 1982 101 p refs
(Contract N00014-79-C-0121; NR Proj. 243-027; RR0210203)
(AD-A118800; Rept-243-027-013) Avail: NTIS HC A06/MF A01 CSCL 20/2

Epitaxial thin films of beta-SiC of up to five microns in thickness have been reproducibly grown on (100) and (111) Si single crystal wafers. A two-step process involving the initial chemical conversion of the Si surface to SiC using C2H4 alone followed by direct CVD of SiC using both SiH4 and C2H4 was employed to achieve this objective. Theoretical CVD phase diagrams for the Si-C-H and Si-C-Ar system have been calculated for various reactive gases, Si/Si+C ratios, temperatures and total pressures. Amorphous Sic has also been produced using a remodeled RF sputtering unit. Author (GRA)

N83-13019# Litton Systems, Inc., Morris Plains, N. J. Airtron Div.
MANUFACTURING METHODS AND TECHNOLOGY ENGINEERING FOR GROWTH OF LARGE DIAMETER Nd: YAG LASER CRYSTALS Interim Progress Report, 1 Apr. 1980 - 31 Mar. 1981
Robert Uhrin and Roger F. Belt Mar. 1982 38 p refs
(Contract DAAB08-77-C-0375)
(AD-A118748) Avail: NTIS HC A03/MF A01 CSCL 13/3

Continued experimentation on the growth of Nd:YAG in boule sizes of 2 inch diameter was performed in this report period. The axial and radial gradients received more attention. It was found that the use of a Dy2O3 stabilized zirconia for insulation has given a very favorable growth gradient for our 4.5 x 4.5 inch crucibles. Twelve runs were started over a year. GRA

N83-13020# Washington State Univ., Pullman. Dept. of Physics.

ROLE OF LASER-INDUCED PRIMARY-DEFECT FORMATION IN OPTICAL BREAKDOWN IN NaCl Final Report, 1 May 1979 - 31 Aug. 1980
Peter F. Braunlich Oct. 1981 39 p refs
(Contract DE-AS08-79DP-40105)
(DE82-002062; DOE/DP-40105/1; WSU-L2) Avail: NTIS HC A03/MF A01

Rapid and efficient formation of primary defects (V sub k-, F-, and H-centers, self-trapped excitons) influence the kinetics processes involved in laser-induced optical breakdown in alkali halides. These processes were studied for the case of NaCl exposed to short (30 psec to 30 nsec) laser pulses at lambda = 532 nm wavelength. Rapid defect formation acts as a drain on the free electrons and holes, produced by multiphoton absorption in the laser photon field. As a consequence, the rate of temperature increase of the lattice by free or dressed carrier absorption is reduced and, thus the damage threshold is increased. This effect is compensated by additional channels of energy deposition to the lattice which are provided by formation of and photon absorption by the generated primary defects. DOE

N83-13021# Xerox Palo Alto Research Center, Calif.
STRUCTURE AND ELECTRONIC STUDIES OF DEFECTS IN AMORPHOUS SILICON Final Report, May 1981 - Apr. 1982
R. A. Street, D. K. Biegelsen, D. Haneman, W. Jackson, J. C. Knights, R. Nemanich, M. Rosenblum, C. C. Tsai, and J. Zesch Jul. 1982 30 p
(Contract DE-AC02-77CH-00178)
(DE82-018228; SERI/TR-9079-1-T7) Avail: NTIS HC A03/MF A01

The properties of glow discharge deposited amorphous silicon were studied with emphasis on two aspects of the structural properties of a-Si:H and the role of the defects and localized states on the transport and recombination. One structure aspect concerns the reactions that take place at a metal/a-Si:H interface. The other is the use of NMR to study the hydrogen bonding, particularly the spin-lattice relaxation times. The details of recombination are studied by luminescence and light-induced ESR. Optically detected magnetic resonance and time-resolved ESR were also used. High temperature recombination and trapping were investigated by using the time-of-flight transient photoconductivity method, obtaining the trapping parameters for capture of both electrons and holes at dangling bonds. A limited number of p-i-n solar cells were made and their properties and collection efficiency investigated. Using the technique of photothermal deflection spectroscopy, which measures weak optical absorption, the extrinsic absorption from dangling bonds has been identified and correlated with other measurements. DOE

N83-13022# Hughes Research Labs., Malibu, Calif.
SEMICONDUCTOR MEASUREMENT TECHNOLOGY: DIFFERENTIAL CAPACITANCE-VOLTAGE PROFILING OF SCHOTTKY BARRIER DIODES FOR MEASURING IMPLANTED DEPTH DISTRIBUTIONS IN SILICON
R. G. Wilson and D. M. Jamba Feb. 1982 63 p refs
(Contract NBS-5-35891)
(PB82-183575; NBS-SP-400-71; LC-81-600162) Avail: NTIS HC A04/MF A01 CSCL 09A

Experimental and analytical aspects of differential capacitance-voltage profiling of ion implanted carrier depth distributions using reverse biased Schottky barrier diodes are discussed. The accuracies, experimental errors, and ranges of applicability are considered. Author (GRA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

No abstracts in this category.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N83-13023# National Park Service, Washington, D. C.
MAN IN SPACE Reconnaissance Survey, 1903 - 1981
Harry Butowsky Nov. 1981 103 p refs
(PB82-186784; FNP-400-82-15) Avail: NTIS HC A06/MF A01 CSCL 05F

The possible locations, components, and features of a new unit of the national park system, with special emphasis on the internationally historic event of the first human contact with the surface of the Moon was investigated. Methods for safeguarding identified locations, structures, and instrumentation features and for displaying and interpreting them to the visiting public were studied. The preliminary findings concerning the historic features associated with the U.S. space program, in particular the first Moon landing are documented. An overview of the space program, a description of the major sites and facilities associated with the program, and an analysis of the significance and condition of those features are presented. GRA

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-13024*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on NASA Scientific and Technological Program Reviews.
AERONAUTICS RESEARCH AND TECHNOLOGY. A REVIEW OF PROPOSED REDUCTIONS IN THE FY 1983 NASA PROGRAM
National Academy Press Jul. 1982 79 p refs Sponsored by NASA
(NASA-CR-169386; NAS 1.26:169386) Avail: NTIS HC A05/MF A01 CSCL 05J

Reductions in the Fiscal Year 1983 program from the original proposal to the levels of the appropriation request submitted to Congress are reviewed. The request asked for an assessment of the national criticality of the excluded programs and, for each one, the risk (probability of success) associated with achieving the objectives sought and the degree to which it might be assumed by the private sector. Based on this request, a charge comprising an assessment of those aeronautics projects excluded from the FY 1983 budget request to Congress, the likelihood that industry would undertake them, the impact of their not being done, and the more general question of the need for government to bridge the gap between the aeronautics research and technology base and early application was developed. The charge further specifies that the assessment is to encompass considerations of safety, national defense, efficient transport, and the national economy. S.L

N83-13025# Desmatics, Inc., State College, Pa.
DATA INTEGRATION: COMBINING REAL-WORLD AND SIMU-

LATION DATA
Dennis E. Smith Aug. 1982 19 p refs
(Contracts N00014-75-C-1054; N00014-79-C-0650; NR Proj. 042-334; NR Proj. 277-291)
(AD-A118245; TR-106-12) Avail: NTIS HC A02/MF A01 CSCL 05/10

In any form of scientific research or decision making, it is desirable to draw upon all relevant data which is available. Unfortunately, data derived from different sources often takes on forms which are incompatible. Consequently, much of the information not used and is thereby effectively "lost." Simulation users frequently find themselves in this situation when observations have been obtained from a computer model and from the corresponding real-world situation it simulates. Although the real-world observations comprise the most valid of the two data sets, the other set may also contain useful information. Author (GRA)

N83-13026# Auburn Univ., Ala. Dept. of Economics.
ALLOCATING R&D RESOURCES: A STUDY OF THE DETERMINANTS OF R&D BY CHARACTER OF USE Executive Summary
A. N. Link Aug. 1981 9 p
(Grant NSF PRA-8009552)
(PB82-193343; NSF/PRA-81020) Avail: NTIS HC A02/MF A01 CSCL 05A

An empirical analysis of firm and industry characteristics important in determining the firm's allocation of its research and development (R&D) is summarized. It is found that a set of firm characteristics can be identified as influencing the firm's allocation of its R&D. The statistical analysis illustrates that profitability and the receipt of Federal R&D are significant determinants of the firm's level of R&D spending, holding constant characteristics of the industry in which the firm produces. In the regression analysis, three industry characteristics are held constant: market concentration, indexes of technological opportunity, and product complexity. It is shown that R&D is a heterogeneous category of activities and that no one set of factors influences the firm's decision to allocate R&D funds to any particular use category. GRA

N83-13027# Forecasting International Ltd., Arlington, Va.
EVALUATION OF TECHNOLOGY ASSESSMENTS AND DEVELOPMENT OF EVALUATION PROTOCOLS, PROJECT REPORT
M. J. Cetron, E. F. Bishop, and J. J. Hendry Feb. 1982 240 p refs
(Grant NSF PRA-80-22613)
(PB82-197393; NSF/PRA-82005) Avail: NTIS HC A11/MF A01 CSCL 05A

The elements of the six technology assessments considered are compared in order to determine consistent patterns of analysis and to identify "generic items" which could be included in checklists of elements to be considered in TA evaluations. These analyses also draw out many subsidiary issues and ideas which may be of interest to both the TA evaluator and the general reader. The recommended format and methodology for structuring a TA summary or 'synopsis' is described in a way that presents the important assumptions, information, and policy recommediations in a concise and easily retrievable format. Detailed directions for application of the evaluation protocol developed are provided, including recommended checklists and other tools. GRA

N83-13028# Forecasting International Ltd., Arlington, Va.
EVALUATION OF TECHNOLOGY ASSESSMENTS AND DEVELOPMENT OF EVALUATION PROTOCOLS Executive Summary
M. J. Cetron, E. F. Bishop, and J. J. Hendry Feb. 1982 53 p
(Grant NSF PRA-80-22613)
(PB82-197385; NSF/PRA-82007) Avail: NTIS HC A04/MF A01 CSCL 05A

A group to technology assessments (TA's) were studied to determine whether there were any consistent patterns in the analysis, policy option identification, or other elements which could provide useful guidance in the efficient management of TA's. Some of the topics outlined in this summary are: the project methodology and experience; analysis and comparison of the elements of the TA's considered; TA goals established and achieved; policy and technology options; problematic issues; the unique nature of the problem-oriented TA; terms of reference of risk; the technology assessment synopsis format; and the evaluation protocol. The major conclusion of the research was that there are features among previously performed TA's which can be rearranged into consistent patterns of analysis which cut across differing technologies. Distilling the elements of the TA permits design of a number of patterns of analysis, depending upon intended use. Two examples are the synopsis format and policy format. The synopsis format is the more refined and successful of the analyses. GRA

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-13029# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE THE NIH CLINICAL CENTER Final Report
Paul W. Blackmon Jan. 1982 240 p refs 6 Vol.
(Contract NO1-CL-0-2117)
(PB82-190083; NIH-79-302-1-Vol-1) Avail: NTIS HC A11/MF A01 CSCL 05B

A Technicon medical information system (MIS) is used to support patient care, research, and administrative activities. In general, the system at the clinical center performs the same functions, in the same way, as other Technicon systems. Unique features of the MIS are its functions to support research, its interface with the Honeywell CLMMS (Clinical Laboratory Medical Management System), its support of the blood bank, and its capability for dental clinic and social work reporting. The technicon MIS was designed to assume the clerical and communication burden associated with all tasks from the origination of a medical order to the documentation of its completion. An important feature of the system for research purposes is the use of standard protocol sets. These standard orders were included to ensure that, as required for the success of the research, prescribed protocols for patients participating in research programs are adhered to strictly. GRA

N83-13030# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE NIH CLINICAL CENTER. VOLUME 2: APPENDICES ON DETAILED FUNCTIONAL PERFORMANCE AND CONDUCT OF RESEARCH Final Report
Paul W. Blackman Jan. 1982 791 p refs 6 Vol.
(Contract NO1-CL-0-2117)
(PB82-190091; NIH-79-302-2-Vol-2) Avail: NTIS HC A99/MF A01 CSCL 05B

The medical staff interacts with MIS through various features providing for order entry and patient information retrieval. Medical orders are entered directly by physicians or transcribed by nursing personnel. Patient information may be displayed or printed by category, such as radiology reports, laboratory data, and medication summaries. In addition, information is summarized and printed at daily and weekly intervals for inclusion in the patient chart. MIS supports research activities mainly through two types of features: (1) standard protocol order sets to assure adherence to clinical protocols, and (2) spin-off tapes of patient care information for inclusion in a large archival medical data retrieval system. The specific functions performed by MIS in support of patient care and research activities of the medical staff are listed. GRA

N83-13031# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE NIH CLINICAL CENTER. VOLUME 3: APPENDIX ON TECHNICAL PERFORMANCE Final Report

Paul W. Blackmon Jan. 1982 144 p refs
(Contract NO1-CL-0-2117)
(PB82-190109; NIH-79-302-3-Vol-3) Avail: NTIS HC A07/MF A01 CSCL 05B

The technical performance of MIS was evaluated. The system performance was assessed in terms of seven high level aspects of system operations. For each aspect of performance several areas of investigation (AOI) were studied. Seven data collection methods were used to collect the data that are aggregated to the various AOIs. The automated system that serves as the context for the data collection methods, areas of investigation, and performance aspects is described. The methodology for the technical aspects; by listing the selected areas of investigation under overall system, location specific, and survey areas; and by explaining the data collection methods. Each of the subsections contains tables relating the concepts in that subsection to the concepts in the other subsections. GRA

N83-13032# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE NIH CLINICAL CENTER. VOLUME 4: APPENDIX ON COST-BENEFIT ANALYSIS Final Report
Paul W. Blackmon Jan. 1982 72 p refs 6 Vol.
(Contract NO1-CL-0-2117)
(PB82-190117; NIH-79-302-4-Vol-4) Avail: NTIS HC A04/MF A01 CSCL 05B

The cost-benefit analysis relates the costs and benefits of the MIS and alternative information processing systems, and provides that information as a basis for making decisions about the capability for medical information system processing. Difficulties associated with the design and conduct of a cost benefit analysis are discussed. GRA

N83-13033# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE NIH CLINICAL CENTER. VOLUME 5: APPENDICES ON SURVEYS Final Report
Paul W. Blackmon Jan. 1982 224 p refs 6 Vol.
(Contract NO1-CL-0-2117)
(PB82-190125; NIH-79-302-5-Vol-5) Avail: NTIS HC A10/MF A01 CSCL 05B

Material relating to the surveys administered as a part of the evaluation of the medical information system is presented. The methodology used in conducting the survey portion of the evaluation is discussed. The survey instruments that were administered and the editing procedures used in analyzing the survey data are presented. GRA

N83-13034# Anser Analytic Services, Inc., Arlington, Va.
EVALUATION OF THE MEDICAL INFORMATION SYSTEM AT THE NIH CLINICAL CENTER. VOLUME 6: APPENDICES ON DATA COLLECTION Final Report
Paul W. Blackmon Jan. 1982 360 p refs 6 Vol.
(Contract NO1-CL-0-2117)
(PB82-190133; NIH-79-302-6-Vol-6) Avail: NTIS HC A16/MF A01 CSCL 05B

Material relating to the conduct of the data collection as a part of the evaluation of the medical information system is presented. The handbook is used by the data collectors in collecting functional performance data. The technical performance data collection procedures are discussed and examples of the associated forms and printouts are presented. The workbook that was used in the conduct of the benefit assessment procedure for the cost benefit analysis is also presented. GRA

N83-13035# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Data Management and Computation.
DATA MANAGEMENT AND COMPUTATION. VOLUME 1: ISSUES AND RECOMMENDATIONS Final Report
1982 186 p refs
(PB82-188113) Avail: NTIS HC A09/MF A01 CSCL 05B

The problems that users have encountered relating to acquisitions, analysis, and distribution of space science data are summarized, and ways to improve NASA data management systems are recommended. Author (GRA)

N83-13036# Physical Research Lab., Ahmedabad (India).
COMPUTERISED BOOK PROCUREMENT SYSTEM: SYSTEM ANALYSIS
D. R. Kulkarni, R. R. Bharucha, and S. Bakre Oct. 1981 48 p
(PB82-188947; PRS/TN-81-08) Avail: NTIS HC A03/MF A01 CSCL 05B

A detailed systems analysis for the computerized book procurement system to process the requests for the new books in the Library of Physical Research Laboratory is described. The system monitors the status of processing of each individual request received by the library and subsequently assists the library staff in taking appropriate actions immediately. The mechanization of certain standard procedures and the prompt actions taken by the system would help considerably in minimizing the procurement period. The system also helps in accessioning and cataloging the book after it has been procured. GRA

N83-13037# Office of Management and Budget, Washington, D.C.
MANAGING FEDERAL INFORMATION RESOURCES: REPORT UNDER THE PAPERWORK REDUCTION ACT OF 1980 Annual Report
1 Apr. 1982 79 p refs
(PB82-194473; AR-1) Avail: NTIS HC A05/MF A01 CSCL 05B

The objectives of the Paperwork Reduction Act are to: (1) reduce the information burden imposed on the public by the Federal government; (2) reduce the cost of collecting, managing, and disseminating information by Federal agencies; (3) ensure that Federal agencies collect only as much information as they need and can use effectively; (4) eliminate inconsistencies among Federal information policies by ensuring uniformity wherever possible; (5) improve the efficiency of government programs through the effective use of information technology; and (6) establish safeguards to protect the legitimate privacy and confidentiality concerns of individuals and enterprises. To accomplish these objectives, the Act sets in place several major organizational requirements and enforcement mechanisms. Author (GRA)

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

No abstracts in this category.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-13038*# Garrett Turbine Engine Co., Phoenix, Ariz.
ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS Semiannual Progress Report, Jul. - Dec. 1980
Jul. 1981 151 p refs
(Contract DEN3-167)
(NASA-CR-165329; DOE/NASA-0167-81-2; NAS 1.26:165329; GTEC-31-3725(2); SAPR-2) Avail: NTIS HC A08/MF A01 CSCL 13F

An automotive gas turbine powertrain system which, when installed in a 1985 production vehicle (3000 pounds inertia weight), is being developed with a CFDC fuel economy of 42.8 miles per gallon based on Environmental Protection Agency (EPA) test procedures and diesel No. 2 fuel. The AGT-powered vehicle shall give substantially the same overall vehicle driveability and performance as a comparable 1985 production vehicle powered by a conventional spark ignition powertrain system (baseline system). Gaseous emissions and particulate levels less than: NOx = 0.4 gm/mile, HC = 0.41 gm/mile, and CO = 3.4 gm/mile, and a total particulate of 0.2 gm/mile, using the same fuel as used for fuel economy measurements is expected, along with the ability to use a variety of alternate fuels. S.L.

N83-13039# Ohio State Univ., Columbus. Coll. of Engineering.
AN EXPERIMENTAL STUDY OF AN ULTRA-MOBILE VEHICLE FOR OFF-ROAD TRANSPORTATION Semiannual Technical Report, 1 Oct. 1981 - 31 Mar. 1982
Robert B. McGhee and Kenneth J. Waldron Aug. 1982 92 p refs
(Contract MDA903-82-K-0058)
(AD-A118474; OSURF-762945/714250) Avail: NTIS HC A05/MF A01 CSCL 06/4

This report summarizes research accomplished during the first six months of a project aimed at field testing of an experimental vehicle making use of an actively controlled suspension system for improved off-road mobility. The first year of this project involves component evaluation and concept verification with reduced-scale laboratory models. Preliminary test results and projections of performance to be expected in the full-scale vehicle are included in this report. Author (GRA)

N83-13040# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va. Electric Power Lab.
VERIFICATION TESTS OF THE LECTRA MOTORS CORPORATION LECTRA 2+2 Progress Report, 20 Oct. 1980 - 3 Apr. 1981
Edward J. Dowgiallo, Jr., Ivan R. Snellings, and Robert D. Chapman Apr. 1982 34 p
(Contract EC-77-A-31-1042)
(AD-A118718; MERADCOM-2356) Avail: NTIS HC A03/MF A01 CSCL 13/6

The Lectra 2+2 manufactured by Lectra Motors Corporation was tested at MERADCOM as part of the Department of Energy project to verify conformity to performance standards of electric vehicles. It is standard Datsun 310 which has been converted to an electric vehicle. It is powered by 18 6-V batteries through an SCR controller, by Cableform, to a 22-hp, series-wound d.c. motor. It is equipped with a four-speed manual transmission, front disc brakes with drum in the rear. It is not equipped with regenerative braking. GRA

N83-13041# Weston (Roy F.), Inc., West Chester, Pa.
DEMONSTRATION OF SYNERGISTIC INDUSTRIAL ENERGY/MUNICIPAL SOLID WASTE DISPOSAL FACILITY
Sep. 1981 164 p Prepared in cooperation with County of Delaware, Media, Pa. and Scott Paper Co., Chester 3 Vol.
(Contract DE-FG01-79CS-20245)
(DE82-001145; DOE/CS-20245/2-Vol-1) Avail: NTIS HC A08/MF A01

The completion of Phase 1 of the Demonstration of Synergistic Industrial Energy/Municipal Solid Waste Disposal Facility is discussed. The opportunities available to recover material and energy resources from solid waste, both within and outside the County boundaries are discussed. The general engineering concepts necessary to achieve successful resource recovery are discussed. Preliminary cost estimates, technical evaluations, and economic analyses are presented. A recommendation for selecting specific resource recovery concepts is given, and a recommended work plan for the next phase of the study is presented. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-13042*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE FUTURE OF HIGH ENERGY GAMMA RAY ASTRONOMY AND ITS POTENTIAL ASTROPHYSICAL IMPLICATIONS
Carl E. Fichtel Aug. 1982 28 p refs
(NASA-TM-83986; NAS 1.15:83986) Avail: NTIS HC A03/MF A01 CSCL 03A

Future satellites should carry instruments having over an order of magnitude greater sensitivity than those flown thus far as well as improved energy and angular resolution. The information to be obtained from these experiments should greatly enhance knowledge of: the very energetic and nuclear processes associated with compact objects; the structure of our galaxy; the origin and dynamic pressure effects of the cosmic rays; the high energy particles and energetic processes in other galaxies; and the degree of matter-antimatter symmetry of the universe. The relevant aspects of extragalactic gamma ray phenomena are emphasized along with the instruments planned. The high energy gamma ray results of forthcoming programs such as GAMMA-1 and the Gamma Ray Observatory should justify even more sophisticated telescopes. These advanced instruments might be placed on the space station currently being considered by NASA. A.R.H.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-13043# Washington Univ., Seattle. Lab. for Nuclear Physics.
ISOTOPIC-ABUNDANCE RATIOS AND DIRAC'S LARGE-NUMBERS HYPOTHESIS
Eric B. Norman 1981 6 p refs
(Contract DE-AC06-81ER-40048)
(DE82-020194; DOE/ER-40048/5L2) Avail: NTIS HC A02/MF A01

It is demonstrated that the continuous creation of either neutrons or protons within atomic nuclei at the rates predicted by Dirac's Large Numbers Hypothesis would have produced isotopic abundance ratios that are in serious disagreement with the observed values. DOE

N83-13044# Chalmers Univ. of Technology, Goteborg (Sweden).
HIGH SENSITIVITY MOLECULAR LINE OBSERVATIONS OF IRC+10216
H. Olofsson, L. E. B. Johansson, A. Hjalmarson, and Nguyen Quang-Rieu 1981 59 p refs
(PB82-187220; RR-142) Avail: NTIS HC A04/MF A01 CSCL 03B

The results of an extensive observational study, including model fits, of the molecular envelope surrounding the carbon star IRC+10216 are described. Molecular transitions, isotopes, and gas envelope expansion velocity are addressed. GRA

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance*. For space stations see *15 Launch Vehicles and Space Vehicles*.

N83-13045# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY OF SIMILARITY FUNCTIONS IN THE PLANETARY BOUNDARY LAYER M.S. Thesis [UM ESTUDO DAS FUNCOES DE SIMILARIDADE DA CAMADA LIMITE PLANETARIA]
Julio Cesar Santos Chagas Sep. 1982 81 p refs In PORTUGUESE; ENGLISH summary
(INPE-2539-TDL/102) Avail: NTIS HC A05/MF A01

Micrometeorological data obtained over tropical savannah (Koorin Experiment, 16 deg 16'S; 133 deg 23'E, Australia) were used to evaluate the similarity functions A, B and C in the planetary boundary layer. Different flux profile relationships, and scaling parameters for wind and temperature were utilized in the calculations. In Addition, the observed boundary layer height was also used as the scaling parameter. The use of vertically averaged geostrophic wind and potential temperature gave less scatter of points than the specified local values at the top of the boundary layer. The results were compared with previous studies. In general, the curves of the similarity function A showed higher values if compared with others. In the case of the similarity function B the agreement with previous results is good. The results of the similarity function C showed comparatively higher than the other investigations. Thus, a part of the above noted disparities must have been spurious probably caused by large roughness parameter of vegetation, different ways of determining surface fluxes, and of defining external variables. So, the empirical determination of the similarity functions indicate doubts on the universality of these relations. S.L.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-13046# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SOLAR TIDE IN THE ATMOSPHERIC SODIUM LAYER [MARE SOLAR NA CAMADA ATMOSFERICA DE SODIO]
P. P. Batista, B. R. Clemesha, V. W. J. H. Kirchhoff, and D. M. Simonich Jun. 1982 22 p refs IN PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Brazil, 6-14 Jul. 1982 Sponsored in part by the National Fund for Scientific and Technological Development
(INPE-2449-PRE/147) Avail: NTIS HC A02/MF A01

Mesospheric sodium layer observations obtained during day and night with INPE's laser radar at Sao Jose dos Campos, SP (23 deg 12 min S, 45 deg 51 min W) are presented. The average variation of the layer during 24 hours displays oscillations with 12 hour and 24 hour periods. The results are interpreted with the aid of a theory of atmospheric wave propagation for minor constituent layers. Oscillations are separated into 24 hour and 12 hour components. The 24 hour component shows the characteristics of an evanescent mode with maximum density occurring at 3 hours. The 12 hour component shows propagation of phase with height and a vertical wavelength of approximately 54 km. Athor

N83-13047*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVIDENCE FOR INHOMOGENEOUS THERMAL SOURCES OF TWO SPIKE EVENTS OF 1978, MAY 5 AND DECEMBER 4
H. J. Wiehl and Upendra Desai Sep. 1982 29 p refs Submitted for publication
(NASA-TM-84929; NAS 1.15:84929) Avail: NTIS HC A03/MF A01 CSCL 03B

Two short duration single spike events of 1978 May 5 and December 4 exhibit similar time profiles in the microwave and hard X-ray ranges, indicating emission from compact sources. Microwave spectral observations exhibit inhomogenieties present in the source parameters. The existence of fine time structures in the microwave time profiles at 10.4 GHz from Berne are interpreted as a signature of the dynamics of a disturbance travelling through the souce at the ion-sound speed. Stereoscopic observations with the hard X-ray detector on the solar orbiter, Helios-2, and the Berne microwave antennae do not indicate any time lag or differences in the time profiles during the impulsive phase. This is taken as evidence for the absence of directionality of emission making beam models unlikely for short duration single spike events. Author

N83-13048*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE PINHOLE/OCCULTER FACILITY
J. R. Dabbs, E. A. Tandberg-Hanssen, and H. S. Hudson (California Univ., San Diego) Oct. 1982 16 p
(NASA-TP-2089; NAS 1.60:2089) Avail: NTIS HC A02/MF A01 CSCL 03B

The outer solar atmosphere exhibits a great variety of dynamic and energetic plasma phenomena, from the catastrophic energy release of solar flares to the steady acceleration of the solar wind. The Pinhole/Occulter Facility contains the instruments necessary for broadband X-ray imaging, combined with simultaneous ultraviolet and white light spectroscopy and imaging. S.L.

N83-13049*# Stanford Univ., Calif. Inst. for Plasma Research.
REVIEW OF OBSERVATIONS RELEVANT TO SOLAR OSCILLATIONS
Philip H. Scherrer Aug. 1982 17 p refs Sponsored in part by the Max C. Fleischmann Foundation
(Contract NAS5-24420; Grant NGR-05-020-559; Contract N00014-76-C-0207; Grant NSF ATM-77-20580)
(NASA-CR-169387; NAS 1.26:169387; SU-IPR-929) Avail: NTIS HC A02/MF A01 CSCL 03B

Recent solar oscillation observations and methods used are described. Integrated or almost integrated sunlight (Sun as a star observation) was observed. The most certain observations are in the 5 minute range. The p-mode and g-mode oscillations are expected from 3 to more than 300 minutes. The possible period ranges are described into the three intervals: (1) the 5 minute range for which the most dramatic and certain results are reported; (2) the 10 to 20 minute range for which solar diameter oscillations are reported; and (3) the 160 minute oscillation found in velocity and several other quantities. E.A.K.

N83-13050# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.

SOLAR-GEOPHYSICAL DATA, PROMPT REPORTS
Helen E. Coffey, ed. Apr. 1981 163 p refs
(PB82-195793; NOAA-82031504-Pt-1; Rept-440-Pt-1) Avail: NTIS HC A08/MF A01 CSCL 03B

In addition to an index for 1980-1981, data are provided for March 1981 on: alert periods, daily solar indices, solar flares, solar radio emission, Boulder Geomagnetic Substorm Log, inferred interplanetary magnetic field polarities, and mean solar magnetic field. Data are also provided for February 1981 on: daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays, geomagnetic indices, spacecraft observations, and radio propagation indices. Late data include cosmic rays January 1981 and geomagnetic indices January 1981. GRA

N83-13051# Systems and Applied Sciences Corp., Riverdale, Md.
SOLAR RADIATIVE FLUX CALCULATIONS FROM STANDARD SURFACE METEOROLOGICAL OBSERVATIONS
Ralph Shapiro 1 Mar. 1982 55 p refs
(Contract F19628-81-C-0042; AF Proj. 2688)
(AD-A118775; SR-1; AFGL-TR-82-0039) Avail: NTIS HC A04/MF A01 CSCL 03/2

The flux of solar radiation through a model atmosphere composed of n layers and a ground surface is represented by a system of 2n+2 linear equations. The system is solved in closed form explicitly for the radiation reaching the ground and the radiation reflected back to space, as a function of the vertically incident radiation and specified reflection and transmission coefficients for each of the n layers and the ground. These coefficients vary in time and space as functions of a wide variety of parameters. However, they are primarily dependent upon cloud amount and cloud thickness or type. In spite of some past measurement programs, the cloud coefficients are not very well known. Making use of direct observations of the total solar radiation reaching the ground and simultaneous cloud observations, the model offers the opportunity for determining the mean transmission and reflection characteristics of any individual cloud type. The model is flexible with regard to the number of layers chosen to represent the atmosphere and with regard to the sophistication of the physics to be incorporated. With the use of the SOLMET data tapes, a first approximation calculation is described for the reflection, transmission, and absorption coefficients for a three-layer atmosphere containing high, middle, and low cloud types. Once these coefficients have been determined, the flux of solar radiation is calculated from routine surface meteorological observations. A test of the model on independent data shows no loss in accuracy as compared with that obtained with the developmental data sample. Author (GRA)

N83-13052# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA. COMPREHENSIVE REPORTS
Helen E. Coffey, ed. Jan. 1982 116 p refs
(PB82-197302; NOAA-82031106-Pt-2; Rept-449-Pt-2) Avail: NTIS HC A06/MF A01 CSCL 03B

In addition to an index for 1980-81, data are provided for July 1981 on: solar radio emission, solar X-ray radiation, and mass ejections from the Sun. March 1980 data include H-alpha flares, daily flare indices and intervals of no flare patrol observation. Miscellaneous data include energetic solar particles and plasma June 1980 and May 1981. GRA

N83-13053# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
ANNOTATED ATLAS OF H-ALPHA SYNOPTIC CHARTS
P. S. McIntosh Jul. 1982 337 p Prepared in cooperation with NOAA, Boulder, Colo.
(Contract N00024-78-C-5384; MIPR-FY7121-79-00007)
(AD-A118170; UAG-70; AFGL-TR-82-0212) Avail: NTIS HC A15/MF A01 CSCL 03/2

This volume presents a record of large-scale solar magnetic fields and solar activity during 130 solar rotations, from November 1964 through July 1974, in the form of H-alpha synoptic charts and accompanying descriptive notes. A new perspective on large-scale magnetic fields is provided by the inference of lines of polarity reversal from the systems of structures visible in H-alpha patrol filtergrams. These structures map the neutral lines in the radial component of solar magnetic fields (McIntosh, 1972a), thereby revealing details of the boundaries to large-scale magnetic fields that are not recorded in magnetograms sensitive to the longitudinal (line-of-sight) component of the fields. This atlas testifies that neutral lines are of themselves important physical features in solar activity. They are associated directly with systems of physical structures. They form continuous lines that often encircle the entire sun. They have lifetimes in excess of 2 years. The neutral-line patterns normally predate, and survive, the occurrence of important centers of sunspot and flare activity. GRA

N83-13054# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA. COMPREHENSIVE REPORTS
Helen E. Coffey, ed. Apr. 1981 55 p refs
(PB82-195801; NOAA-82031505-Pt-2; Rept-440-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 03B

In addition to an index for 1980-1981, data are provided for October 1980 on: solar radio emission, solar X-ray radiation, and mass ejections from the Sun. Miscellaneous data include: active regions Aug. 29 to Sept. 25, 1980, synoptic solar maps Aug. 29 to Sept. 25, 1980, and energetic solar particles April 1980. GRA

N83-13055# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA. PROMPT REPORTS
Helen E. Coffey, ed. Jan. 1982 203 p refs
(PB82-197294; NOAA-82031105-Pt-1; Rept-449-Pt-1) Avail: NTIS HC A10/MF A01 CSCL 03B

In addition to an index for 1980 to 1981, data are previded for December 1981 on: alert periods, daily solar indices, solar plares, solar radio emission, spacecraft observations, inferred interplanetary magnetic field polarities, mean solar magnetic field, and Boulder Geomagnetc Substorm Log. Data are also presented for November 1981 on: daily solar activity centers, sudden ionospheric disturbances, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices. Late data include sudden ionospheric disturbances October 1981, daily calcium plage index October 1981, solar radio emission October 1981, cosmic rays May - October 1981, geomagnetic indices October 1981, and daily solar activity centers - Kitt Peak Solar Magnetic Field (Rotations 1709-1713) and Helium 10830A (Rotations 1707-1713) and synoptic charts. GRA

N83-13056# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA. PART 2: COMPREHENSIVE REPORTS. NUMBER 448: DATA FOR JUNE 1981 AND MISCELLANEA
Helen E. Coffey Dec. 1981 51 p refs 2 Vol.
(PB82-184748; SGD-448-Pt-2; NOAA-82021003-Pt-2) Avail: NTIS HC A04/MF A01 CSCL 03B

In addition to an index for 1980-81, data are presented for June 1981 on: solar radio emission, solar X-ray radiation, and mass ejections from the Sun. Miscellaneous data include active regions 1-29 May 1981, synoptic solar maps 1-29 May 1981, and solar flares -- internals of no flare patrol observation February 1980. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

N83-13057# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Lab.

THE NOAA-ERL-SEL SOLAR UV RADIATION RESEARCH PROJECT: PROGRAM DESCRIPTION Progress Report
Richard F. Donnelly Oct. 1981 78 p
Avail: NTIS HC A04/MF A01 CSCL 03B

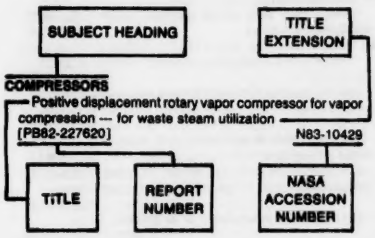
Research within SEL of the temporal variations of solar ultraviolet radiation is reviewed. The relation of this NOAA research to NASA'S solar radiation research for climate studies is discussed. The necessity of the Joint NOAA-NASA SBUV/2 program for satellite UV measurements is emphasized. Progress on a collaborative program to analyze Dr. D. F. Heath's NIMBUS-7 SBUV measurements of the solar UV spectral irradiance is summarized. Support for improved rocket-flight measurements of solar UV spectral irradiance is discussed. The importance of obtaining accurate recalibration is stressed. Recalibration flights are needed to permit accurate intercomparison of the NIMBUS-7 solar UV measurements at the maximum of solar cycle 21 with the SBUV/2 measurements planned for the upcoming solar minimum and for solar cycle 22. Author (GRA)

99 GENERAL

N83-13058# National Science Foundation, Washington, D.C.
GUIDE TO PROGRAMS, FISCAL YEAR 1983
1982 86 p
(NSF-82-57) Avail: SOD HC

The criteria for the selection of research projects is presented. Research programs in the areas of mathematical and physical sciences; engineering; biological, behavioral, and social sciences, astronomical, atmospheric, Earth, and ocean sciences; etc., are discussed. S.L.

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABLATION
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
ABSORPTION
Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982
ABSORPTIVITY
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967
ABSTRACTS
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
ACCELERATION (PHYSICS)
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049
ACCIDENT PREVENTION
Effects of metric change on safety in the workplace for selected occupations
[AD-A118595] N83-12279
ACCURACY
Research Issues in the Determination of Simulator Fidelity: Proceedings of the ARI sponsored Workshop
[AD-A118253] N83-12106
Signal processing by counters and digital processing of LDA signals N83-12419
ACEE PROGRAM
Opportunities for composites in commercial transport structures N83-12148
ACETYLENE
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189
ACOUSTIC IMPEDANCE
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967
ACOUSTIC MEASUREMENT
Combustion instability in solid propellants
[INPE-2507-PRE/187] N83-12249
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
Feasibility of acoustically determining the thickness of sea ice
[AD-A118499] N83-12830
ACOUSTIC VELOCITY
Geotechnical, geoacoustical, and sedimentological properties of thirteen bottom sediment cores collected in the shallow water approaches to Norfolk, Virginia
[AD-A118166] N83-12832
ACOUSTICS
Advances in nondestructive evaluation technology N83-12169
Changes in the organ of hearing produced by sound
[AD-A118003] N83-12850
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971
ACTIVATED CARBON
Biological processes in the treatment of municipal water supplies
[PB82-199704] N83-12664
ACTUATORS
Slack wire strike protection concepts
[AD-A118827] N83-12056
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098
ADAPTIVE CONTROL
Nulling in linear array patterns with minimization of weight perturbations
[AD-A118695] N83-12310
Research in adaptive control: Hybrid and constrained structure systems
[AD-A118534] N83-12918
ADDITIVES
PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
ADHESION
Tribology N83-12167
ADHESIVE BONDING
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172
ADMIXTURES
On the mechanisms of the deposition of atmospheric admixtures to the ground surface — air pollution, aerosols N83-12628
AERATION
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670
AERIAL PHOTOGRAPHY
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements
[AD-A118751] N83-12779
Image understanding research
[AD-A118738] N83-12994
AERIAL RECONNAISSANCE
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020981] N83-12512
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513
AEROACOUSTICS
Correlation of core noise obtained by three signal coherence techniques
[NASA-TM-83012] N83-12966
AEROBIOLOGY
Weather and airborne organisms
[WMO-562] N83-12793
AERODYNAMIC CHARACTERISTICS
An investigation of the aerodynamic characteristics of a new general aviation airfoil in flight
[NASA-CR-169477] N83-12046
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050
Airworthiness and flight characteristics test. Part 1: YAH-64 advanced attack helicopter
[AD-A118490] N83-12075
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] N83-12522
Aerodynamic analysis of horizontal axis wind turbines N83-12530
Airfoil data for wind turbines N83-12531
AERODYNAMIC CONFIGURATIONS
Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072
Aerodynamics on a transport aircraft type wing-body mode
[PB82-206855] N83-12081
AERODYNAMIC LOADS
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133
A new capability for elastic aircraft airloads via NASTRAN N83-12484
AERODYNAMIC NOISE
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972
AERODYNAMIC STALLING
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
AERODYNAMICS
Aeronautical engineering: A continuing bibliography (supplement 152)
[NASA-SP-7037(152)] N83-12038
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
The transiton and dynamics of bounded and free shear layers
[AD-A118665] N83-12380
AEROELASTICITY
A new capability for elastic aircraft airloads via NASTRAN N83-12484

AERONAUTICAL ENGINEERING
Aeronautical engineering: A continuing bibliography (supplement 152)
[NASA-SP-7037(152)] N83-12038
Biotechnology research requirements for aeronautical systems through the year 2000, volume 1
[AD-A118457] N83-12844
Biotechnology research requirements for aeronautical systems through the year 2000, volume 2
[AD-A118458] N83-12845
Aeronautics research and technology. A review of proposed reductions in the FY 1983 NASA program
[NASA-CR-169386] N83-13024

AEROSOLS
Problems of air pollution monitoring --- in the U.S.S.R. N83-12607
On the mechanisms of the deposition of atmospheric admixtures to the ground surface --- air pollution, aerosols N83-12628
Atmospheric backscatter model development for CO sub 2 wavelengths
[NASA-CR-3638] N83-12682
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke
[PB82-188813] N83-12715

AEROSPACE ENGINEERING
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
State of space science and technology --- Indian space program N83-12114

AEROSPACE SYSTEMS
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318

AFRICA
Technical Conference on Climate: Africa
[WMO-596] N83-12736
The climate of Africa, including feasibility study of climate alert system N83-12737
Characteristics of the tropospheric mean wind flow over Africa during northern winter season N83-12739
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
Summary of the climatological data situation in Africa N83-12741
Use of climatic information for land use planning and crop diversification --- in Africa N83-12742
The weather anomalies during the northern summers of 1972 and 1978 over Africa N83-12743
Application of climate data and information in the management of water resources --- in Africa N83-12755
Aridity in east Africa: Climatic geomorphology of water resources N83-12756
Methodologies for assessing solar energy potential --- in Africa N83-12758
The significance of African climate in human health N83-12761
Climatological aspects of human settlements in Africa N83-12762
Manpower resources in Africa: Training requirements and opportunities --- meteorological services N83-12765

AGING (MATERIALS)
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
Fireset materials aging study
[DE82-020368] N83-12170

AGRICULTURE
The possible modifications of the Hisse model for pure LANDSAT agricultural data N83-12497
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753

AGRISTARS PROJECT
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482
Second generation crop yield models review
[E83-10003] N83-12483
Performance comparison for Barnes model 12-1000, Exotech model 100, and Ideas Inc. Biometer Mark 2
[E83-10004] N83-12484
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee
[E83-10006] N83-12486
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data --- South Dakota
[E83-10008] N83-12487
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491
Winter wheat stand density determination and yield estimates from handheld and airborne scanners --- Montana
[E83-10013] N83-12492
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
Development of advanced acreage estimation methods
[E83-10015] N83-12494
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
AgRISTARS documents tracking list report
[E83-10019] N83-12502
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
Missing observations in multiyear rotation sampling designs
[E83-10022] N83-12505
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506

AGROCLIMATOLOGY
Summary of the climatological data situation in Africa N83-12741
Use of climatic information for land use planning and crop diversification --- in Africa N83-12742
Climatological aspects of in-harvest and post-harvest losses N83-12749
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753
Climatic changes and their effects on the biosphere. The fourth IMO lecture
[WMO-542] N83-12792

AGROMETEOROLOGY
Agrometeorological monitoring for crop prediction N83-12747
Prediction of range production from weather records in Africa --- livestock breeding N83-12748
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751

AIR BREATHING ENGINES
High temperature catalytically assisted combustion
[AD-A118641] N83-12188

AIR CARGO
Impact of advanced air transport technology. Part 2: The air cargo system, background paper
[PB82-186818] N83-12919

AIR DROP OPERATIONS
Static testing to evaluate airtanker delivery performance --- distribution of flame retardants in forest fires
[PB82-179946] N83-12079

AIR FILTERS
Use of Freon for in-place filter testing
[DE82-008030] N83-12660

AIR FLOW
The CMC:3DPNS computer program for prediction of three-dimensional, subsonic, turbulent aerodynamic juncture region flow. Volume 1: Theoretical
[NASA-CR-3645] N83-12352

AIR INTAKES
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044

AIR MAIL
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296

AIR MASSES
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798
Focusing mechanisms in the Texas flash floods of 1978
[PB82-185380] N83-12822

AIR NAVIGATION
Omega data bank report (Spring through Fall, 1980)
[DOT/FAA-CT-82-5] N83-12062

AIR POLLUTION
Problems of air pollution monitoring --- in the U.S.S.R. N83-12607
Monitoring of complementary parameters indispensable for interpretation and use of data on pollution in rainfall N83-12610
Ozone problem in connection with monitoring the state of the atmosphere N83-12611
On the USSR national system of observations and assessment of long range transport of air pollutants N83-12618
On the spatial interpolation of air pollution fields N83-12621
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627
On the mechanisms of the deposition of atmospheric admixtures to the ground surface --- air pollution, aerosols N83-12628
A new method for study of injurious effect of dust pollution on leaves N83-12637
Tropospheric chemistry and air pollution
[WMO-583] N83-12663
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672
Iowa air quality report, 1980
[PB82-189614] N83-12675

AIR QUALITY
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
Smoke management: A workbook for balancing air quality and land management goals
[PB82-188830] N83-12673
Iowa air quality report, 1980
[PB82-189614] N83-12675

AIR SAMPLING
Aircraft and remote measurements of atmospheric transport of pollutants within the global integrated monitoring system N83-12620

AIR TRAFFIC
A study of the feasibility of statistical analysis of airport performance simulation
[NASA-CR-3633] N83-12959

AIR TRAFFIC CONTROL
Preliminary evaluation of the basic experimental active Beacon Collision Avoidance System (BCAS)
[DOT/FAA-RD-82-67] N83-12058
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
ARTS 2A design analysis
[FAA-RD-82-54] N83-12064
Traffic alert and Collision Avoidance System (TCAS 1) design guidelines
[ATC-114] N83-12066
TCAS 1 design guidelines
[ATC-114] N83-12067
The AMPS computer system: Design and operation
[ATC-110] N83-12867

AIR WATER INTERACTIONS
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions --- GARP Atlantic Tropical Experiment (GATE) N83-12733
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798

AIRBORNE EQUIPMENT
Aircraft and remote measurements of atmospheric transport of pollutants within the global integrated monitoring system N83-12620

AIRCRAFT ACCIDENTS
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A118692] N83-12055
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246

AIRCRAFT COMPARTMENTS
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237
AIRCRAFT CONFIGURATIONS
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
AIRCRAFT CONSTRUCTION MATERIALS
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Polymer research at NASA Langley Research Center N83-12149
Polymer materials research at NASA Ames Research Center N83-12150
Polymer matrix composites research at NASA Lewis Research Center N83-12151
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212
AIRCRAFT CONTROL
A technical analysis of rehosting the National Aerospace System software
[AD-A118828] N83-12069
AIRCRAFT DESIGN
Aeronautics research and technology. A review of proposed reductions in the FY 1983 NASA program
[NASA-CR-169386] N83-13024
AIRCRAFT DETECTION
Traffic alert and Collision Avoidance System (TCAS 1) design guidelines
[ATC-114] N83-12066
TCAS 1 design guidelines
[ATC-114] N83-12067
AIRCRAFT ENGINES
An engine installation for fan jet STOL aircraft using USB powered high lift system (I) engine matching test for circular confluent exhaust duct
[NAL-TR-703] N83-12086
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094
Polymer matrix composites research at NASA Lewis Research Center N83-12151
AIRCRAFT INSTRUMENTS
Computer graphic presentation of conventional cockpit instruments
[ARL-SYS-NOTE-82] N83-12082
AIRCRAFT LANDING
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100
AIRCRAFT MAINTENANCE
Recommendations for automated monitoring of radio equipment associated with flight service stations
[FAA-CT-82-31] N83-12298
AIRCRAFT MODELS
Strain gage load measurement on the shuttle orbiter
[NASA-TM-84898] N83-12135
AIRCRAFT NOISE
Aircraft noise reduction
[PB82-206095] N83-12080
Correlation of core noise obtained by three signal coherence techniques
[NASA-TM-83012] N83-12966
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973
Operational noise data for UH-60A and CH-47C Army helicopter
[AD-A118796] N83-12974
Area equivalent method: A quick procedure for determining noise impact at civilian airports
[PB82-195892] N83-12975
AIRCRAFT PARTS
Tribology N83-12167
AIRCRAFT PERFORMANCE
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100
AIRCRAFT PILOTS
The relationship between effort rating and performance in a critical tracking task
[FAA-EM-81-13] N83-12853
AIRCRAFT RELIABILITY
Airworthiness and flight characteristics test. Part 1: YAH-64 advanced attack helicopter
[AD-A118490] N83-12075
AIRCRAFT SAFETY
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A118692] N83-12055
ARTS 2A design analysis
[FAA-RD-82-54] N83-12064
AIRCRAFT STRUCTURES
Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Opportunities for composites in commercial transport structures N83-12148
Fatigue and fracture research in metals N83-12158
AIRCRAFT WAKES
An investigation of the aerodynamic characteristics of a new general aviation airfoil in flight
[NASA-CR-169477] N83-12046
Measurement of wake interactions of a canard and a forward swept wing
[AD-A118756] N83-12053
AIRFOIL PROFILES
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048
AIRFOILS
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
Airfoil data for wind turbines N83-12531
AIRFRAMES
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
AIRLINE OPERATIONS
Impact of advanced transport technology. Part 3: Air service to small communities
[PB82-186800] N83-12920
AIRPORT SURFACE DETECTION EQUIPMENT
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063
AIRPORTS
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
A study of the feasibility of statistical analysis of airport performance simulation
[NASA-CR-3633] N83-12959
Area equivalent method: A quick procedure for determining noise impact at civilian airports
[PB82-195892] N83-12975
AIRSPACE
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
A technical analysis of rehosting the National Aerospace System software
[AD-A118828] N83-12069
ALASKA
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710
Definition of Alaskan Aviation training requirements N83-12852
ALBEDO
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821
ALGEBRA
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523
Differential/algebraic systems and matrix pencils
[DE82-020138] N83-12946
ALGORITHMS
Research on adaptive antenna techniques, 4
[AD-A118802] N83-12315
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 2. Users manual
[AD-A118497] N83-12324
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 3. Computer codes
[AD-A118498] N83-12325
Introduction to multi-grid methods for the numerical solution of boundary value problems N83-12374
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473
Algorithmic complexity, volume 2
[AD-A118814] N83-12892
Algorithmic complexity, volume 1
[AD-A118813] N83-12893
Algorithms for program verification
[AD-A118570] N83-12894
Development of an image segmentation algorithm called MITES
[AD-A118577] N83-12897
Starting step size for an ODE solver
[DE82-020422] N83-12904
Computing a trust region step
[DE82-005656] N83-12905
Research in adaptive control: Hybrid and constrained structure systems
[AD-A118534] N83-12918
Multi-Dimensional continued fraction algorithms
[REPT-145] N83-12928
Solve: A non linear least-squares code and its application to the optimal placement of torsatron vertical field coils
[DE82-015605] N83-12950
ALKALINE EARTH COMPOUNDS
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
ALLOCATIONS
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
ALPHA PARTICLES
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] N83-12996
Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] N83-12997
ALPINE METEOROLOGY
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
Report of the second session of the Intergovernmental Planning Meeting on Alpex — Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804
ALTERNATIVES
Smoke management: A workbook for balancing air quality and land management goals
[PB82-186830] N83-12673
ALTITUDE
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
ALTITUDE CONTROL
The 30 LORAN-C navigator documentation
[DOT/FAA-RD-82-16] N83-12065
ALUMINUM ALLOYS
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Advanced powder metallurgy aluminum alloys and composites N83-12156
Application of aluminium alloys to large welded structures in Japan N83-12216
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
Some studies on the aluminium alloy formation during sintering of metal powders N83-12230
Testing of the permanent magnet material Mn-Al-C for potential use in propulsion motors for electric vehicles
[NASA-CR-169481] N83-12329
ALUMINUM GALLIUM ARSENIDES
Solar-cell testing and evaluation
[DE82-016179] N83-12562
AMAZON REGION (SOUTH AMERICA)
Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827
AMBIENT TEMPERATURE
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787
AMMONIA
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661

AMORPHOUS MATERIALS
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983
The correlation of nitrocellulose properties and cellulose feedstock crystal structure
[AD-A118677] N83-13012
Structure and electronic studies of defects in amorphous silicon
[DE82-018228] N83-13021

AMPLIFICATION
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968

AMPLIFIER DESIGN
Design concepts for a high-impedance narrow-band 42 GHz power TWT using a fundamental/forward ladder-based circuit
[NASA-CR-165262] N83-12330
Reactanceless bandpass amplifier
[NASA-CASE-GSC-12788-1] N83-12333

AMPLIFIERS
Design and experimental study of low noise hot-wire anemometer with constant current mode
[NAL-TR-697] N83-12391

AMPLITUDES
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306
A dual differential interferometer
[NASA-CASE-LAR-12966-I] N83-12969

ANAEROBES
Photosynthetic water splitting
[PB82-200684] N83-12206
Anaerobic digestion of lime sludge
[AD-A118502] N83-12656
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657

ANALOG CIRCUITS
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302

ANALOG TO DIGITAL CONVERTERS
Digital solar sensor project for attitude determination
[INPE-2495-PRE/178] N83-12392

ANALYSIS (MATHEMATICS)
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite
[INPE-2549-RPE/422] N83-12692
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058

ANALYSIS OF VARIANCE
A two-stage elimination type procedure for selecting the largest of several normal means with a common unknown variance
[AD-A118501] N83-12943
A study of the feasibility of statistical analysis of airport performance simulation
[NASA-CR-3633] N83-12959

ANALYTICAL CHEMISTRY
Methods for background monitoring of pollutants in natural media --- used in the U.S.S.R. N83-12649

ANEMOMETERS
Laser Velocimetry
[VKI-LS-1981-3] N83-12408
Studies of particle motion by laser Doppler techniques N83-12414
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787

ANISOTROPY
Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] N83-12998

ANNUAL VARIATIONS
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753

ANOMALIES
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063
The weather anomalies during the northern summers of 1972 and 1978 over Africa N83-12743

ANTENNA ARRAYS
Nulling in linear array patterns with minimization of weight perturbations
[AD-A118695] N83-12310
Research on adaptive antenna techniques, 4
[AD-A118802] N83-12315
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319

ANTENNA FEEDS
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063

ANTENNA RADIATION PATTERNS
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation
[BBC-RD-1982/17] N83-12293
Asymptotic theory of the scattering of axially symmetric reflectors
[INPE-2402-TDL/089] N83-12295
Development of computer models for the prediction of large distorted antenna characteristics
[NASA-CR-169479] N83-12304
Computer modeling of a wideswath SAR concept employing multiple antenna beam formation techniques
[NASA-CR-167757] N83-12305
Nulling in linear array patterns with minimization of weight perturbations
[AD-A118695] N83-12310
Phase-only nulling as a least-square approximation to complex weight nulling
[AD-A118722] N83-12323

ANTENNAS
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318

ANTHRACENE
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186

ANTIMISTING FUELS
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247
Frictional characteristics and heat transfer of antirnisting fuels in tubes
[NASA-CR-169388] N83-12248

ANTISYMMETRY
Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467

APPLICATIONS PROGRAMS (COMPUTERS)
Guidelines for using the AMDLIB, IMSL and NAG mathematical software libraries at ANL
[ANL-81-73] N83-12884
Soviet mathematical programming
[AD-A116970] N83-12934

APPROACH INDICATORS
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057

APPROXIMATION
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050
Implementation and testing of a suboptimal procedure for attaining control in dynamic optimization problems
[INPE-20508-TDL/098] N83-12917
Multi-Dimensional continued fraction algorithms
[REPT-145] N83-12928
Multidimensional additive spline approximation
[SU-ORION-006] N83-12931
Approximation order from bivariate C1-cubics: A counter example
[AD-A118606] N83-12937
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954

AQUATIC PLANTS
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674

AQUEOUS SOLUTIONS
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] N83-12250

AQUIFERS
Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] N83-12706
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708

ARCHAEOLOGY
Preliminary investigations: Archaeology and sediment geomorphology, navigation pool 12, Upper Mississippi River. Volume 2. Technical documents and site data sheets
[AD-A118798] N83-12698

ARCHITECTURE
Earth-covered buildings: An exploratory analysis for hazard and energy performance
[PB82-189564] N83-12285
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
Telluride School, • Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
Climatological aspects of building with special reference to wind related phenomena N83-12760

ARCHITECTURE (COMPUTERS)
Operating in the age of NASTRAN N83-12453
NASTRAN of the HEP N83-12465
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916

ARCTIC REGIONS
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606

ARID LANDS
Aridity in east Africa: Climatic geomorphology of water resources N83-12756

ARITHMETIC AND LOGIC UNITS
VLSI array processor
[AD-A118550] N83-12340

ARMATURES
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332

AROMATIC COMPOUNDS
Fireset materials aging study
[DE82-020368] N83-12170

ARPA COMPUTER NETWORK
National software works development
[AD-A118494] N83-12886

ARRAYS
VLSI array processor
[AD-A118550] N83-12340

ARTIFICIAL SATELLITES
Perturbation of artificial satellites due to tides
[INPE-2388-PRE/108] N83-12124
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511

ASPHALT
Current practices on nighttime pavement construction asphaltic concrete
[DOT/FAA-RD-80-121] N83-12101
Evaluation of Chem-Crete
[PB82-187808] N83-12284

ASSAYING
GAMIDEN: A program to aid in the identification of unknown materials by gamma-ray spectroscopy
[DE82-021960] N83-12203

ASSESSMENTS
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674

ASTRONOMICAL SPECTROSCOPY
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4
[NASA-TM-84929] N83-13047

ASTRONOMY
State of space science and technology --- Indian space program N83-12114

ASTROPHYSICS
The future of high energy gamma ray astronomy and its potential astrophysical implications
[NASA-TM-83986] N83-13042

ASYMMETRY
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467

ASYMPTOTIC METHODS
Asymptotic theory of the scattering of axially symmetric reflectors
[INPE-2402-TDL/089] N83-12295

ATLANTIC OCEAN
On particle ionization rates in the lower ionosphere over the South Atlantic magnetic anomaly
[INPE-2497-PRE/180] N83-12679

Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827

ATMOSPHERIC BOUNDARY LAYER
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
A baroclinic model of two layers for use in numerical weather forecasting
[INPE-2547-RPE/421] N83-12721
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions --- GARP Atlantic Tropical Experiment (GATE) N83-12733
A numerical study of vertical modes of a model of primitive equations
[INPE-2364-PRE/097] N83-12922

ATMOSPHERIC CHEMISTRY
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118698] N83-12425
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480
Ozone problem in connection with monitoring the state of the atmosphere N83-12611
The evolution of carbon dioxide --- in the Earth environment N83-12631
Tropospheric chemistry and air pollution
[WMO-583] N83-12663
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696
Geophysical monitoring for climatic change no. 9
[PB82-193061] N83-12813

ATMOSPHERIC CIRCULATION
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
Major tasks of GATE N83-12725
A/B and B scale motion and balances in the ITCZ area --- GARP Atlantic Tropical Experiment (GATE) N83-12732
Characteristics of the tropospheric mean wind flow over Africa during northern winter season N83-12739
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
Documentation for the Community Climate Model (CCM) version O
[PB82-194192] N83-12812

ATMOSPHERIC COMPOSITION
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407
Estimating cloud parameters for Neros I
[PB82-186552] N83-12814

ATMOSPHERIC DENSITY
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
Atmospheric density models, including tides
[AD-A118723] N83-12701

ATMOSPHERIC DIFFUSION
Estimation of pollution concentration at Cacapava, SP, using a three dimensional numerical model
[INPE-2529-RPE/417] N83-12597
Exchange of carbon dioxide between a forest and the atmosphere
[DE82-020061] N83-12658
Review of atmospheric diffusion models for regulatory applications
[WMO-581] N83-12662

ATMOSPHERIC ELECTRICITY
Electrical fields at stratospheric balloon altitudes
[INPE-2556-TDL/103] N83-12690

ATMOSPHERIC MODELS
Numerical simulation of air pollutant spreading processes by transport equation N83-12629
Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651
Description of a one dimensional global carbon cycle model
[CSIRO-TECHNICAL-PAPER-42] N83-12676
Atmospheric backscatter model development for CO sub 2 wavelengths
[NASA-CR-3638] N83-12682
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
Atmospheric density models, including tides
[AD-A118723] N83-12701
A baroclinic model of two layers for use in numerical weather forecasting
[INPE-2547-RPE/421] N83-12721
Large-scale numerical modelling --- GARP Atlantic Tropical Experiment (GATE) N83-12730
Documentation for the Community Climate Model (CCM) version O
[PB82-194192] N83-12812
A numerical study of vertical modes of a model of primitive equations
[INPE-2364-PRE/097] N83-12922

ATMOSPHERIC MOISTURE
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke
[PB82-186813] N83-12715
Technique development for weather forecasting
[AD-A118744] N83-12781

ATMOSPHERIC OPTICS
An interactive model for atmospheric correction in satellite images
[INPE-2500-PRE/182] N83-12681

ATMOSPHERIC PRESSURE
High temperature catalytically assisted combustion
[AD-A118641] N83-12188
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York
[AD-A118471] N83-12776

ATMOSPHERIC RADIATION
Ge(Li) telescope for observing atmospheric gamma ray lines in the Southern Hemisphere
[INPE-2513-PRE/192] N83-12686
Latitudinal variation of telluric and atmospheric gamma-ray radiation
[INPE-2538-PRE/201] N83-12689
Radiation processes and their parameterization --- GARP Atlantic Tropical Experiment (GATE) N83-12734

ATMOSPHERIC SOUNDING
Initial results from HF propagation studies during solid shield
[AD-A118492] N83-12309

ATMOSPHERIC TEMPERATURE
Development of an airborne sonic thermometer
[AD-A118774] N83-12400
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite
[INPE-2549-RPE/422] N83-12692

ATMOSPHERIC TIDES
Atmospheric density models, including tides
[AD-A118723] N83-12701
Solar tide in the atmospheric sodium layer
[INPE-2449-PRE/147] N83-13046

ATOMIC BEAMS
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001

ATOMIZING
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246

ATTENUATION
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971

ATTITUDE STABILITY
Conditions of attitude stability for a flexible satellite
[INPE-2389-PRE/109] N83-12125

AUDIO FREQUENCIES
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302

AUDITORY DEFECTS
Changes in the organ of hearing produced by sound
[AD-A118003] N83-12850

AUGMENTATION
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983

AUTOCLAVING
Processing composite materials N83-12153

AUTOMATIC CONTROL
The continuous flow analyzer automation system. Part 1: Functional specifications
[PB82-191081] N83-12404
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] N83-13008
An experimental study of an ultra-mobile vehicle for off-road transportation
[AD-A118474] N83-13039

AUTOMOBILE ENGINES
Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines
[NASA-CR-169475] N83-12088
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165178] N83-12431
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report N83-12439
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165329] N83-13038

AUTOMOBILE FUELS
Assessment of current and projected future trends in light-duty-vehicle fuel switching. Subtask 1
[DE82-018816] N83-12440

AUTOMOBILES
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report N83-12439

AUTOREGRESSIVE PROCESSES
A study of meteorological time series. Part 2: Applications of autoregressive models
[INPE-2519-PRE/194-PT-2] N83-12717

AUXILIARY POWER SOURCES
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586

AVIONICS
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864

AXES OF ROTATION
Aerodynamic analysis of horizontal axis wind turbines N83-12530
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter N83-12535

AXIAL FLOW
The WISGSK: A computer code for the prediction of a multistage axial compressor performance with water ingestion
[NASA-CR-3624] N83-12093

AXIAL FLOW TURBINES
Users manual for WIND N83-12534

AXISYMMETRIC FLOW
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459

AZIMUTH
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297

B

BACKSCATTERING
Atmospheric backscatter model development for CO sub 2 wavelengths
[NASA-CR-3638] N83-12682
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983

BALLOON-BORNE INSTRUMENTS
A telescope for ultraviolet photometry
[INPE-2439-PRE/140] N83-12990

BALTIC SEA
Scientific aspects of the organization of biological monitoring of the Baltic Sea ecosystem state N83-12635

BANDPASS FILTERS
An active filter capable of realizing any stable transfer function
[INPE-2554-RPE/418] N83-12331
Reactanceless bandpass amplifier
[NASA-CASE-GSC-12788-1] N83-12333
Analysis of a function to approximate the envelope of a bandpass random signal
[AD-A118460] N83-12941

BANDWIDTH
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility
[NASA-TM-83969] N83-12396

BAROCLINIC INSTABILITY
Baroclinic analysis of the Southern Hemisphere
[INPE-2541-PRE/203] N83-12683
A baroclinic model of two layers for use in numerical weather forecasting
[INPE-2547-RPE/421] N83-12721
BAROCLINIC WAVES
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
BAROTROPIC FLOW
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
BARREN LAND
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
BARRIER LAYERS
Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
BARRIERS
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666
BATHYMETERS
Depth estimation in the airborne oceanographic LIDAR postflight bathymetry processor
[PB82-188194] N83-12838
BAYES THEOREM
Models and estimation procedures for the analysis of subjects-by-items data arrays
[AD-A118730] N83-12856
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906
The selection of smoothness priors for distributed lag estimation
[AD-A118598] N83-12940
A randomized solution for multi-Bayes estimates of the multinormal mean
[TR-69] N83-12952
The prediction of a future observation by more than one Bayesian
[TR-68] N83-12953
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954
Three-Bayesian estimation of a multinormal mean: An example
[TR-72] N83-12956
BEACON COLLISION AVOIDANCE SYSTEM
Preliminary evaluation of the basic experimental active Beacon Collision Avoidance System (BCAS)
[DOT/FAA-RD-82-67] N83-12058
BEACON SATELLITES
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187931] N83-12108
BEADS
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
BEAM CURRENTS
FX-25 and FX-100 propagation experiments
[AD-A118755] N83-12981
BEAM INJECTION
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] N83-13008
BEAMS (RADIATION)
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
BEAMS (SUPPORTS)
Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
BEARING (DIRECTION)
Finite element models for predicting crack growth characteristics in composite materials
[NASA-CR-169478] N83-12213
BEHAVIOR
A neurobehavioral study of rats using a model perfluorinated acid, NDFDA
[AD-A118560] N83-12843
BENDING
Strain gage load measurement on the shuttle orbiter
[NASA-TM-84898] N83-12135
BENDING MOMENTS
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
BERING SEA
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
BETATRONS
Injection of a high current beam into a modified betatron accelerator
[AD-A118581] N83-12980
BIBLIOGRAPHIES
Aeronautical engineering: A continuing bibliography (supplement 152)
[NASA-SP-7037(152)] N83-12038
AgRISTARS documents tracking list report
[E83-10019] N83-12502
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
BINARY ALLOYS
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224
BINOMIALS
On isotonic selection rules for binomial populations better than a standard
[AD-A118548] N83-12961
BIOACOUSTICS
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973
BIOASSAY
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661
BIOCONVERSION
Questions and answers about energy recovery from waste
[DE82-022154] N83-12580
BIOENGINEERING
Biological processes in the treatment of municipal water supplies
[PB82-199704] N83-12664
Biotechnology research requirements for aeronautical systems through the year 2000, volume 1
[AD-A118457] N83-12844
Biotechnology research requirements for aeronautical systems through the year 2000, volume 2
[AD-A118458] N83-12845
BIOGEOCHEMISTRY
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606
BIOLOGICAL EFFECTS
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
Progress in the study of contamination effects in the marine environment --- effects on marine organisms N83-12615
Monitoring requirements for biological systems --- in a global pollution context N83-12632
Determination of biota responses to anthropogenic impacts in the system of background monitoring --- using biological models N83-12633
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom --- insecticides in the food chain N83-12634
Scientific aspects of the organization of biological monitoring of the Baltic Sea ecosystem state N83-12635
Study of wild animal pollution by pesticides: Methodological aspects N83-12642
BIOLOGICAL EVOLUTION
Persistence in model ecosystems
[PB82-196916] N83-12669
BIOLOGICAL MODELS (MATHEMATICS)
Determination of biota responses to anthropogenic impacts in the system of background monitoring --- using biological models N83-12633
Mathematical bases for modeling exogenic succession --- in an ecological system N83-12652
BIOMASS
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
BIOMASS ENERGY PRODUCTION
Fundamental air-gasification engineering parameters
[DE82-021612] N83-12200
BIOPHYSICS
Rice scene radiation research plan N83-12496
BIOSPHERE
Monitoring of the biosphere biological component --- environment pollution N83-12605
Material on the background integrated monitoring of natural environmental pollution --- in the U.S.S.R. N83-12609
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672
Climatic changes and their effects on the biosphere. The fourth IMO lecture
[WMO-542] N83-12792
BIOTECHNOLOGY
Biotechnology research requirements for aeronautical systems through the year 2000, volume 1
[AD-A118457] N83-12844
Biotechnology research requirements for aeronautical systems through the year 2000, volume 2
[AD-A118458] N83-12845
BIVARIATE ANALYSIS
Approximation order from bivariate C1-cubics: A counter example
[AD-A118606] N83-12937
BLADE TIPS
Control systems for horizontal-axis wind turbines N83-12532
BLAST LOADS
Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399
BLOWING
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044
BODY KINEMATICS
A heuristic mathematical model for the dynamics of sensory conflict and motion sickness
[NASA-CR-169472] N83-12847
BODY TEMPERATURE
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
BOEING AIRCRAFT
Aircraft noise reduction
[PB82-206095] N83-12090
BOEING 727 AIRCRAFT
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
BOEING 747 AIRCRAFT
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
BOILERS
The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371
BOILING
Paint solubility testing
[PB82-177049] N83-12244
BOLOMETERS
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004
BOLTS
Fatigue and fracture research in composite materials N83-12152
BOLTZMANN TRANSPORT EQUATION
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case
[DE82-020362] N83-12947
BONDING
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177
BOUNDARY LAYER CONTROL
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044
BOUNDARY LAYER EQUATIONS
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363

Turbulence modelling and boundary layer calculation methods N83-12364
Notes on coordinate generation: Fundamental ideas N83-12376

BOUNDARY LAYER FLOW
Stewartson's triple deck [AD-A118617] N83-12381
Unsteady boundary layer due to an oscillating free stream vs. an oscillating model [AD-A118591] N83-12383

BOUNDARY LAYER TRANSITION
The transiton and dynamics of bounded and free shear layers [AD-A118665] N83-12380

BOUNDARY LAYERS
Application of a radiational boundary condition to a Baroclinic model [INPE-2550-PRE/206] N83-12687

BOUNDARY VALUE PROBLEMS
Computational Fluid Dynamics [VKI-LS-1981-5] N83-12372
Introduction to multi-grid methods for the numerical solution of boundary value problems N83-12374
The Solution of Initial Value Problems Using Interval Arithmetic. Formulation and Analysis of an Algorithm [REPT-144] N83-12926
Lower bounds for the life span of solutions of nonlinear wave equations in three dimensions [AD-A118599] N83-12939
Differential/algebraic systems and matrix pencils [DE82-020138] N83-12946

BRACKETS
Tool for releasing optical elements [NASA-CASE-GSC-12794-1] N83-12434

BRANCHING (MATHEMATICS)
Surface instabilities on an equibiaxially stretched elastic half-space [TR-7] N83-12447

BRAZIL
Low-latitude total ozone measurements in the Brazilian sector [INPE-2509-PRE/188] N83-12596
On the possibility of barotropic instability over northeast Brazil [INPE-2531-PRE/198] N83-12678
Climatological study of the intertropical convergence zone and its influence over the northeast of Brazil [INPE-2534-TDL/101] N83-12720
Forecasting the series of rainfalls at Fortaleza using the Burg maximum entropy method [INPE-2546-RPE/420] N83-12722
Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil [INPE-2543-PRE/203] N83-12827

BREADBOARD MODELS
VLSI array processor [AD-A118550] N83-12340

BRIDGES (STRUCTURES)
Effects of gain and delay time of control devices to structural study [PB82-194152] N83-12286
Data collection and analysis for geothermal research [PB82-185430] N83-12390
Performance tests of full span form bridges [PB82-183039] N83-12475
Field tests of a continuous twin girder steel bridge [PB82-185901] N83-12477

BRIGHTNESS TEMPERATURE
Measurement of soil moisture using remote sensing multisensor radiation techniques [E83-10012] N83-12491

BROADBAND
Tone-excited jet: Theory and experiments [NASA-CR-3538] N83-12968

BROADCASTING
Stereophonic and two channel sound in terrestrial television broadcasting [BBC-RD-1982/18] N83-12292
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation [BBC-RD-1982/17] N83-12293

BUCKLING
Failure characteristics of graphite-epoxy structural components loaded in compression [NASA-TM-84552] N83-12174

BUOYANCY
Hybrid LTA vehicle controllability as affected by buoyancy ratio [NASA-CR-152344] N83-12099
Entrainment and heat flux of buoyant diffusion flames [PB82-196296] N83-12209

BURNING RATE
Application of thermochemical modeling to aircraft interior polymeric materials [NASA-CR-169384] N83-12237

C

C BAND
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979 [NASA-CR-169473] N83-12826

CALCIUM
Chemical durability improvement and static fatigue of glasses [AD-A118837] N83-12242

CALCIUM OXIDES
Mechanisms of dry SO2 control processes [PB82-196924] N83-12668

CALIBRATING
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico [FAA-RD-82-7] N83-12059
The 1981 calibration of the AEDC-PWT aerodynamic wind tunnel (4T) at Mach numbers from 0.1 to 1.3 [AD-A118704] N83-12104
Strain gage load measurement on the shuttle orbiter [NASA-TM-84898] N83-12135
System calibration strategies for spaceborne synthetic aperture radar [PB82-182502] N83-12326
A calibrator for optical instruments that measure Cn2 and crosswind [PB82-188020] N83-12406

CALORIMETERS
Heat of mixing apparatus for liquefied gases [PB82-195645] N83-12403

CANADIAN SPACE PROGRAMS
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508

CANARD CONFIGURATIONS
Measurement of wake interactions of a canard and a forward swept wing [AD-A118756] N83-12053

CANOPIES (VEGETATION)
Rice scene radiation research plan N83-12496

CAP CLOUDS
On the determination of precipitation efficiency [PB82-184938] N83-12820

CAPACITANCE
Superconducting-transmission-line project at the Los Alamos National Laboratory [DE82-021835] N83-12344
Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon [PB82-183575] N83-13022

CAPILLARY WAVES
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth [AD-A118597] N83-12942

CARBIDES
Carbide-binder phases in cemented carbides N83-12233

CARBON
Testing of the permanent magnet material Mn-Al-C for potential use in propulsion motors for electric vehicles [NASA-CR-169481] N83-12329

CARBON COMPOUNDS
Recent advances in carbon-carbon materials systems N83-12162

CARBON CYCLE
Exchange of carbon dioxide between a forest and the atmosphere [DE82-020061] N83-12658
Description of a one dimensional global carbon cycle model [CSIRO-TECHNICAL-PAPER-42] N83-12676

CARBON DIOXIDE
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606
On possible changes of the global climate --- carbon dioxide increase N83-12624
The evolution of carbon dioxide — in the Earth environment N83-12631
Exchange of carbon dioxide between a forest and the atmosphere [DE82-020061] N83-12658
Laboratory studies of solvated gas-phase anions [AD-A118578] N83-12696

CARBON DIOXIDE CONCENTRATION
Description of a one dimensional global carbon cycle model [CSIRO-TECHNICAL-PAPER-42] N83-12676

CARBON DIOXIDE LASERS
Atmospheric backscatter model development for CO sub 2 wavelengths [NASA-CR-3638] N83-12682

CARBON FIBERS
Recent advances in carbon-carbon materials systems N83-12162

CARBON MONOXIDE
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system [NASA-TM-82954] N83-12182
Iowa air quality report, 1980 [PB82-189614] N83-12675

CARBON STARS
High sensitivity molecular line observations of IRC+10216 [PB82-187220] N83-13044

CARBON-CARBON COMPOSITES
Research on ultra-high-temperature materials, monolithic ceramics, ceramic matrix composites and carbon/carbon composites N83-12161

CARBOXYLIC ACIDS
Fireset materials aging study [DE82-020368] N83-12170
Metal phthalocyanine polymers [NASA-CASE-ARC-11405-1] N83-12239

CARCINOGENS
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627

CARGO AIRCRAFT
Impact of advanced air transport technology. Part 2: The air cargo system, background paper [PB82-186818] N83-12919

CARRIER DENSITY (SOLID STATE)
Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon [PB82-183575] N83-13022

CARRIER FREQUENCIES
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications [INPE-2510-PRE/189] N83-12302

CARTESIAN COORDINATES
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459

CASCADE FLOW
Numerical simulation of inviscid compressible flow through two-dimensional cascade by finite area method [NAL-TR-709] N83-12348

CASCADE WIND TUNNELS
Measurement techniques for heat transfer in the turbine using short duration wind tunnel techniques N83-12271

CASE HISTORIES
Metric usage study: A look at 6 case histories [AD-A118601] N83-12312

CATALYSTS
High temperature catalytically assisted combustion [AD-A118641] N83-12188

CATHODES
Long-pulse ion source for neutral-beam applications [DE82-003521] N83-12984

CAVES
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design [DE82-019781] N83-12561

CEILINGS (ARCHITECTURE)
Towards wind-aided flame spread along a horizontal charring slab: The steady-flow problem [PB82-183732] N83-12282

CEILINGS (METEOROLOGY)
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F [AD-A118461] N83-12767
Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F [AD-A118509] N83-12770
Bitburg Air Base, West Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F [AD-A118507] N83-12772
Natrona County/Casper, Wyoming. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F [AD-A118506] N83-12773
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F [AD-A118505] N83-12774
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Fort Know/Godman AAF, Kentucky, parts A-F [AD-A118462] N83-12777

CELESTIAL REFERENCE SYSTEMS
Effects of motion of the equatorial plane on equatorial elements of an Earth satellite [NAL-TR-695] N83-12120

CELLS (BIOLOGY)
Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system --- staining cell structures N83-12645
CELLULOSE
Gasification kinetics for biomass decomposition [PB82-199043] N83-12256
The correlation of nitrocellulose properties and cellulose feedstock crystal structure [AD-A118677] N83-13012
CENTRAL AMERICA
Air Weather Service (AWS) climatic briefs: Latin America [AD-A118449] N83-12769
CENTRAL NERVOUS SYSTEM
A heuristic mathematical model for the dynamics of sensory conflict and motion sickness [NASA-CR-169472] N83-12847
CENTRAL PROCESSING UNITS
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview [E83-10007] N83-12866
CENTRIFUGAL COMPRESSORS
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270
CERAMICS
Fibrous ceramic insulation N83-12160
Research on ultra-high-temperature materials, monolithic ceramics, ceramic matrix composites and carbon/carbon composites N83-12161
Turbine engine materials durability research N83-12163
CH-47 HELICOPTER
Operational noise data for UH-60A and CH-47C Army helicopter [AD-A118796] N83-12974
CHALCOGENIDES
Fireset materials aging study [DE82-020368] N83-12170
CHANNELS (DATA TRANSMISSION)
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility [NASA-TM-83969] N83-12396
CHARGE CARRIERS
Structure and electronic studies of defects in amorphous silicon [DE82-018228] N83-13021
CHARGE EXCHANGE
Plasma parameter measurements using neutral-particle-beam attenuation [DE82-021120] N83-13001
CHARGE TRANSFER
Laboratory studies of solvated gas-phase anions [AD-A118578] N83-12696
CHARTS
Charting utilization requirements for a digital cartographic data base [AD-A118455] N83-12510
CHEBYSHEV APPROXIMATION
Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison [DE81-701030] N83-12962
CHELATES
Metal chelate catalysts for fuel cells [PB82-195637] N83-12592
CHEMICAL ANALYSIS
Colorimetric oil analysis for titanium [AD-A118445] N83-12190
Analytical techniques for aromatic components in aircraft fuels [AD-A118838] N83-12252
Chemical and isotope analysis of trace pollutants in different environmental media N83-12612
Guide to programs, fiscal year 1983 [NSF-82-57] N83-13058
CHEMICAL BONDS
Structure and electronic studies of defects in amorphous silicon [DE82-018228] N83-13021
CHEMICAL COMPOSITION
Metallographic standards for estimating hydrogen content of Zircaloy-4 tubing (LWBR development program) [PB82-022074] N83-12225
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics [DE82-021010] N83-12571
Background parameters of atmospheric precipitation chemical composition as siting criteria for global monitoring stations N83-12646
Research on the chemical composition of precipitation at background stations --- in the U.S.S.R. N83-12647
CHEMICAL ENGINEERING
Polymer science and engineering: Challenges, needs and opportunities N83-12238
CHEMICAL EVOLUTION
The evolution of carbon dioxide --- in the Earth environment N83-12631
CHEMICAL REACTIONS
Chemical durability improvement and static fatigue of glasses [AD-A118037] N83-12242
Paint solubility testing [PB82-177049] N83-12244
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials [NASA-CASE-NPO-15851-1] N83-12986
CHEMICAL REACTORS
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics [DE82-021010] N83-12571
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials [NASA-CASE-NPO-15851-1] N83-12986
CHEMILUMINESCENCE
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide [AD-A118782] N83-12189
CHLOROPHYLLS
Bioassay studies to determine OTECs effect on phytoplankton activity [DE82-021316] N83-12661
CHOKES (RESTRICTIONS)
Critical conditions and the choking mass flowrate in non-equilibrium wet steam flows [CUED/A-TURBO/TR-113] N83-12349
CHROMIUM
Conservation of strategic metals N83-12154
Test methods for evaluating solid waste: Physical/chemical methods [PB82-172156] N83-12210
CHROMIUM ALLOYS
Improved electrodeposited low contraction chromium [AD-A118678] N83-12219
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 1150OC [DE82-021127] N83-12224
CHRONOMETERS
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments [AD-A118710] N83-12197
CIRCUITS
Design and experimental study of low noise hot-wire anemometer with constant current mode [NAL-TR-697] N83-12391
CIRCULAR CYLINDERS
Development of a system to invert eddy-current data and reconstruct flaws --- circular cylindrical tubes [AD-A118767] N83-12442
CIRCULAR TUBES
Development of a system to invert eddy-current data and reconstruct flaws --- circular cylindrical tubes [AD-A118767] N83-12442
CIRRUS CLOUDS
Cirrus particle distribution study, part 8 [AD-A118715] N83-12783
CITIES
National ambient noise survey [PB82-193681] N83-12671
Some climatological aspects of the development of drainage systems in urban areas N83-12763
CIVIL AVIATION
Census of US civil aircraft, calendar year 1981 [AD-A118571] N83-12039
CLASSIFICATIONS
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee [E83-10006] N83-12486
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data --- South Dakota [E83-10008] N83-12487
Development of a corn and soybean labeling procedure for use with profile parameter classification [E83-10014] N83-12493
Development of advanced acreage estimation methods [E83-10015] N83-12494
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
The Akaike information criterion and its application to mixture proportion estimation N83-12498
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project [E83-10024] N83-12507
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview [E83-10007] N83-12866
CLASSIFYING
Recent improvements and enhancements to NASTRAN N83-12454
CLEAN ROOMS
Use of Freon for in-place filter testing [DE82-009030] N83-12660
CLEAR AIR TURBULENCE
Radar applications in cloud and clear-air studies [PB82-192592] N83-12815
CLEARANCES
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
CLIMATE
Main principles of monitoring the natural environment and climate --- pollution effects N83-12600
Comments on the specifications of network stations for monitoring the variability of atmospheric trace constituents significant for climate N83-12619
On possible changes of the global climate --- carbon dioxide increase N83-12624
Technical Conference on Climate: Africa [WMO-596] N83-12736
The climate of Africa, including feasibility study of climate alert system N83-12737
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753
Application of climate data and information in the management of water resources --- in Africa N83-12755
Aridity in east Africa: Climatic geomorphology of water resources N83-12756
The significance of African climate in human health N83-12761
Climatological aspects of human settlements in Africa N83-12762
Some climatological aspects of the development of drainage systems in urban areas N83-12763
Assessing the impact of climate on society: A research review N83-12764
Air Weather Service (AWS) climatic briefs: North America [AD-A118448] N83-12766
Air Weather Service (AWS) climatic briefs: Latin America [AD-A118449] N83-12769
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Osan AB, Korea [AD-A118472] N83-12775
July 1982 environmental data for sites in the National Solar Data Network [DE82-021702] N83-12787
Climatic changes and their effects on the biosphere. The fourth IMO lecture [WMO-542] N83-12792
Documentation for the Community Climate Model (CCM) version O [PB82-194192] N83-12812
Geophysical monitoring for climatic change no. 9 [PB82-193061] N83-12813
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive [PB82-185315] N83-12821
CLIMATOLOGY
On the possibility of barotropic instability over northeast Brazil [INPE-2531-PRE/198] N83-12678
Climatological study of the intertropical convergence zone and its influence over the northeast of Brazil [INPE-2534-TDL/101] N83-12720
The role of climatological information in the protection of plants and animals N83-12746
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report [GARP-FOR-8] N83-12796
Commission for Marine Technology: Abridged report of the 8th Session --- resolutions and recommendations for ocean exploration and exploitation [WMO-584] N83-12803
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981 [WMO-586] N83-12805
Activities of the WMO [WMO-592] N83-12811

Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
CLIMBING FLIGHT
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133
CLOTHING
Measurement of the combined heat and water-vapour flow through clothing under transient conditions
[AD-A118804] N83-12382
CLOUD COVER
Climatic probabilities of the vertical distribution of cloud cover
[AD-A118753] N83-12778
CLOUD SEEDING
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 3: S- and C-band radar observations in support of FACE-2
[PB82-183179] N83-12816
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 6: Cloud-to-ground lightning data for FACE-2
[PB82-183187] N83-12817
Project Skywater data inventory: 1980 - 1981 SCPP season, Sierra Cooperative Pilot Project
[PB82-185174] N83-12819
CLOUDS
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements
[AD-A118751] N83-12779
CLOUDS (METEOROLOGY)
Estimating cloud parameters for Neros I
[PB82-186552] N83-12814
Radar applications in cloud and clear-air studies
[PB82-192592] N83-12815
CLUSTER ANALYSIS
Development of advanced acreage estimation methods
[E83-10015] N83-12494
The Akaike information criterion and its application to mixture proportion estimation N83-12498
COAL
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] N83-12201
Fluidised-bed combustion: Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] N83-12204
COAL GASIFICATION
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542
Neasurement of high-temperature high-pressure processes: A summary report
[PB82-196932] N83-12667
COAL LIQUEFACTION
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] N83-12201
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
COAL UTILIZATION
Fluidised-bed combustion: Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] N83-12204
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] N83-12437
COASTAL ECOLOGY
Changes in the levels of DDE and polychlorinted biphenyl (PCB) contamination of California coastal waters, 1971 - 1977: Use of the mussel, Mytilus californianus, as an indicator species N83-12638
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 12: Biological studies
[PB82-185638] N83-12839
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 13: Biological studies
[PB82-185646] N83-12840
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 16: Biological studies
[PB82-185653] N83-12841
COASTAL WATER
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661
COASTS
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
COATINGS
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
COAXIAL CABLES
Construction, test and delivery of standardized coaxial magnetron
[AD-A118475] N83-12336
COBALT
Conservation of strategic metals N83-12154
COBALT ALLOYS
The powder metallurgy of rare earth-cobalt permanent magnets N83-12234
COBOL
DATAPOINT 8800 COBOL release 2.1
[PB82-195686] N83-12873
National CSS, Incorporated, IBM 360/370 OS/VS COBOL release 2.3
[PB82-192964] N83-12874
Wang Laboratories Inc., VS COBOL version 3, 4, 1, technical report
[PB82-195629] N83-12875
The Sperry Univac V77 series: COBOL 74-800 release IRO
[PB82-193269] N83-12878
IBM 3033 OS/VS COBOL release 2.3
[PB82-192766] N83-12909
Sperry Univac OS.3 COBOL version 07.00/58
[PB82-184920] N83-12911
COCHLEA
Changes in the organ of hearing produced by sound
[AD-A118003] N83-12850
COCKPIT SIMULATORS
Computer graphic presentation of conventional cockpit instruments
[ARL-SYS-NOTE-82] N83-12082
COEFFICIENTS
Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651
COHERENCE
Correlation of core noise obtained by three signal coherence techniques
[NASA-TM-83012] N83-12966
COHERENT LIGHT
Long range LDA wind velocity measurements using visible laser radiation N83-12415
COLLINEARITY
Study of problems of ill-conditioned regression in the presence of multicollinearity
[INPE-2401-PRE/115] N83-12921
COLLISION AVOIDANCE
Traffic alert and Collision Avoidance System (TCAS 1) design guidelines
[ATC-114] N83-12066
TCAS 1 design guidelines
[ATC-114] N83-12067
COLLOCATION
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Simulation of the dropping mercury electrode by orthogonal collocation
[AD-A118689] N83-12187
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments
[AD-A118710] N83-12197
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198
COLOR CODING
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057
COLORADO
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519
COLORADO RIVER (NORTH AMERICA)
Meteorology of important rainstorms in the Colorado River and Great Basin drainages
[PB82-185414] N83-12823
COLORIMETRY
Colorimetric oil analysis for titanium
[AD-A118445] N83-12190
COLUMNS (SUPPORTS)
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
COMBINATORIAL ANALYSIS
Edgeworth expansions for linear combinations of order statistics
[MATH-CENTRE-TRACT-105] N83-12927
COMBINED CYCLE POWER GENERATION
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] N83-12437
COMBUSTION
High temperature catalytically assisted combustion
[AD-A118641] N83-12188
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Applications of Rayleigh scattering to turbulent flows with heat transfer and combustion
[AD-A118576] N83-12385
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
COMBUSTION CHAMBERS
Fluidised-bed combustion: Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] N83-12204
COMBUSTION PRODUCTS
Soot formation in synfuels
[DE82-004271] N83-12199
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672
COMBUSTION STABILITY
Combustion instability in solid propellants
[INPE-2507-PRE/187] N83-12249
COMMAND AND CONTROL
Modernization of the WWMCCS Information System (WIS). Executive summary and main report
[AD-A118784] N83-12314
Data transmitters and command receiver development
[AD-A118739] N83-12322
COMMERCIAL AIRCRAFT
Census of US civil aircraft, calendar year 1981
[AD-A118571] N83-12039
Impact of advanced transport technology. Part 3: Air service to small communities
[PB82-186800] N83-12920
COMMUNICATION EQUIPMENT
Advanced communication system studies
[AD-A118561] N83-12317
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories
[DE82-020120] N83-12915
COMMUNICATION NETWORKS
Next generation communications satellites: multiple access and network studies
[NASA-CR-167903] N83-12129
Modernization of the WWMCCS Information System (WIS). Executive summary and main report
[AD-A118784] N83-12314
Advanced communication system studies
[AD-A118561] N83-12317
COMMUNICATION SATELLITES
Next generation communications satellites: multiple access and network studies
[NASA-CR-167903] N83-12129
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132
COMPARISON
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] N83-12201

COMPATIBILITY
A technical analysis of rehosting the National Aerospace System software
[AD-A118828] N83-12069
COMPENSATORS
Design and experimental study of low noise hot-wire anemometer with constant current mode
[NAL-TR-697] N83-12391
COMPILERS
Burroughs Corporation large systems FORTRAN 77
[PB82-183153] N83-12872
DATAPOINT 8800 COBOL release 2.1
[PB82-195686] N83-12873
National CSS, Incorporated, IBM 360/370 OS/VS COBOL release 2.3
[PB82-192964] N83-12874
Wang Laboratories Inc., VS COBOL version 3, 4, 1, technical report
[PB82-195629] N83-12875
PASCAL compiler functional specification
[PB82-183989] N83-12876
Validation summary report; NCR Corporation V8570 VRX FORTRAN 10
[PB82-183641] N83-12877
The Sperry Univac V77 series: COBOL 74-800 release IRO
[PB82-193269] N83-12878
IBM 3033 OS/VS COBOL release 2.3
[PB82-192766] N83-12909
Burroughs Corporation CP9572 CSM system COBOL release
[PB82-186933] N83-12910
Sperry Univac OS.3 COBOL version 07.00/58
[PB82-184920] N83-12911
The MODCOMP NASA extened FORTRAN 78
[PB82-183146] N83-12912
COMPLETENESS
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
COMPLEX COMPOUNDS
New laser dye systems based on transition metal complexes
[AD-A118699] N83-12426
COMPOSITE MATERIALS
Processing composite materials N83-12153
Recent advances in carbon-carbon materials systems N83-12162
Durability of aircraft composite materials N83-12164
Durability of spacecraft materials N83-12165
Advances in nondestructive evaluation technology N83-12169
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Finite element models for predicting crack growth characteristics in composite materials
[NASA-CR-169478] N83-12213
Effect of HERF on sintering kinetics of ferrographite composites N83-12231
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970
COMPOSITE STRUCTURES
Opportunities for composites in commercial transport structures N83-12148
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172
Performance tests of full span form bridges
[PB82-183039] N83-12475
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
COMPRESSED AIR
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design
[DE82-019781] N83-12561
COMPRESSED GAS
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] N83-12257
COMPRESSIBLE BOUNDARY LAYER
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363
COMPRESSIBLE FLOW
Three dimensional flow computations in a turbine scroll
[NASA-CR-168003] N83-12045
Calculation of compressible flow in and about three-dimensional inlets with and without auxiliary inlets by a higher-order panel method
[NASA-CR-168009] N83-12047
Numerical simulation of inviscid compressible flow through two-dimensional cascade by finite area method
[NAL-TR-709] N83-12348
Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930
COMPRESSION LOADS
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
COMPRESSIVE STRENGTH
Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470
COMPRESSOR BLADES
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
COMPRESSORS
Advanced technologies for turbomachinery systems: An overview
[NASA-TM-82949] N83-12090
COMPUTATION
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523
On the determination of precipitation efficiency
[PB82-184938] N83-12820
Algorithmic complexity, volume 1
[AD-A118813] N83-12893
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
COMPUTATIONAL FLUID DYNAMICS
Non-equilibrium throughflow analyses of low pressure, wet steam turbines
[CUED/A-TURBO/TR-116] N83-12350
Computational Fluid Dynamics
[VKI-LS-1981-5] N83-12372
Higher level simulations of turbulent flows
[SU-TF-16] N83-12373
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375
Notes on coordinate generation: Fundamental ideas N83-12376
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
Numerical methods for two- and three-dimensional viscous flows N83-12378
Operating in the age of NASTRAN N83-12453
Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930
COMPUTER AIDED DESIGN
Computer-aided process preparation for printed wiring boards
[DE82-004522] N83-12343
The CARE 3 phase 3 report: Test and evaluation
[NASA-CR-3631] N83-12865
Solve: A non linear least-squares code and its application to the optimal placement of torsatron vertical field coils
[DE82-015605] N83-12950
COMPUTER DESIGN
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895
Properties of the Wilson-Fowler spline
[DE82-020106] N83-12949
COMPUTER GRAPHICS
Computer graphic presentation of conventional cockpit instruments
[ARL-SYS-NOTE-82] N83-12082
Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455
An interactive review system for NASTRAN N83-12456
SITIM system: Preliminary software design
[INPE-2499-NTE/190] N83-12883
COMPUTER NETWORKS
Traditional computing center as a modern network node
[DE82-006935] N83-12914
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories
[DE82-020120] N83-12915
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916
Data management and computation. Volume 1: Issues and recommendations
[PB82-188113] N83-13035
COMPUTER PROGRAM INTEGRITY
Algorithmic complexity, volume 2
[AD-A118814] N83-12892
Algorithmic complexity, volume 1
[AD-A118813] N83-12893
Algorithms for program verification
[AD-A118570] N83-12894
COMPUTER PROGRAMMING
JOVIAL J73 programming support library
[AD-A118825] N83-12891
Structured programming and PASCAL: A new programming language
[PB82-188921] N83-12913
Properties of the Wilson-Fowler spline
[DE82-020106] N83-12949
COMPUTER PROGRAMS
Aircraft flight procedure program: Data base development
[PB82-183740] N83-12040
Aircraft flight procedure program: Modified computer program model, user's manual
[PB82-183757] N83-12041
A technical analysis of rehosting the National Aerospace System software
[AD-A118828] N83-12069
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements
[NASA-CR-2984] N83-12073
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
A software system for emission spectrometry
[NASA-TM-83001] N83-12181
GAMIDEN: A program to aid in the identification of unknown materials by gamma-ray spectroscopy
[DE82-021960] N83-12203
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 2. Users manual
[AD-A118497] N83-12324
Computer-aided process preparation for printed wiring boards
[DE82-004522] N83-12343
The CMC:3DPNS computer program for prediction of three-dimensional, subsonic, turbulent aerodynamic juncture region flow. Volume 1: Theoretical
[NASA-CR-3645] N83-12352
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Computational modeling of multispectral remote sensing systems: Background investigations
[NASA-CR-165974] N83-12394
Automated balance for determining true mass
[DE82-021737] N83-12402
Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459
Large displacements and stability analysis of nonlinear propeller structures N83-12460
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] N83-12555
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863

Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868
Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration
[NASA-CR-169476] N83-12880
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting
[NASA-TM-81374] N83-12881
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12886
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895
Equivalence testing for FORTRAN mutation system using data flow analysis
[AD-A118840] N83-12896
A data reduction package for US Army Topographic computers: Hand-held programmable calculators
[AD-A118854] N83-12902
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906
FITS: A function fitting program
[DE82-021259] N83-12907
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories
[DE82-020120] N83-12915
AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945

COMPUTER STORAGE DEVICES
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916
Method of and apparatus for generating an interstitial point in a data stream having an even number of data points
[NASA-CASE-MFS-25319-1] N83-12932

COMPUTER SYSTEMS DESIGN
SITIM system: Preliminary software design
[INPE-2499-NTE/190] N83-12883
National software works development
[AD-A118494] N83-12886

COMPUTER SYSTEMS PERFORMANCE
Sneak analysis application guidelines
[AD-A118479] N83-12887

COMPUTER SYSTEMS SIMULATION
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890

COMPUTER TECHNIQUES
Operating in the age of NASTRAN N83-12453
Recent improvements and enhancements to NASTRAN N83-12454
On restarts in NASTRAN N83-12469
Charting utilization requirements for a digital cartographic data base
[AD-A118455] N83-12510
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design
[AD-A118822] N83-12870
Computerised book procurement system: System analysis
[PB82-188947] N83-13036

COMPUTERIZED SIMULATION
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] N83-12555
ROSET: A solar-thermal electric-power simulation users guide
[DE82-021997] N83-12567
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589

COMPUTERS
Burroughs Corporation large systems FORTRAN 77
[PB82-183153] N83-12872
Burroughs Corporation CP9572 CSM system COBOL release
[PB82-186933] N83-12910
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories
[DE82-020120] N83-12915
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058

CONCENTRATION (COMPOSITION)
Application of thin film solid sorbents for estimation of SO2 background concentrations N83-12655

CONCENTRATORS
General introduction to wind energy conversion
[NLR-MP-81014-U] N83-12527
High-intensity solar cells
[DE82-020420] N83-12550
Concentrator-solar-cell development
[DE82-020119] N83-12551

CONCRETE STRUCTURES
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
Performance tests of full span form bridges
[PB82-183039] N83-12475

CONCRETES
Concrete composites. Fiber reinforced polymer concretes: Properties and principles of use
[ISSN-0208-5658] N83-12171
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470

CONDENSING
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525

CONDUCTIVE HEAT TRANSFER
Determination of conductive thermal resistance of plates with nonuniform internal heat generation and under various boundary conditions
[INPE-2512-PRE/191] N83-12351
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523

CONDUCTIVITY
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342

CONFERENCES
Research Issues in the Determination of Simulator Fidelity: Proceedings of the ARI sponsored Workshop
[AD-A118253] N83-12106
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Powder Metallurgy Alloys: Proceedings of the Symposium
[PB82-253931] N83-12227
Computational Fluid Dynamics
[VKI-LS-1981-5] N83-12372
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526
On the Development of Multimedia Monitoring of Environmental Pollution --- conferences
[WMO-563] N83-12599
The report of the Gravity Field Workshop
[NASA-TM-84003] N83-12693
Report of the Monex review meeting
[GARP-SPEC-REPT-38] N83-12707
Technical Conference on Climate: Africa
[WMO-596] N83-12736
First planning meeting for the typhoon operational experiment (TOPEX) --- Tokyo, 17-26 Jun. 1980
[WMO-565] N83-12789
Report of the second session of the Intergovernmental Planning Meeting on Alpex --- Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981
[WMO-586] N83-12805
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861

CONFIDENCE LIMITS
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954
Uncertainty analysis
[DE82-020053] N83-12963

CONFIGURATION MANAGEMENT
JOVIAL J73 programming support library
[AD-A118825] N83-12891

CONFORMAL MAPPING
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377

CONGRESSIONAL REPORTS
Energy conservation strategy for the 1980's
[GPO-66-217] N83-12521
Secretary's report to Congress. Secretary's statement, program review and outlook
[DE82-021878] N83-12581

CONSOLES
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060

CONSTITUTIVE EQUATIONS
Materials constitutive models for nonlinear analysis of thermally cycled structures
[NASA-TP-2055] N83-12449

CONSTRUCTION MATERIALS
Durability of aircraft composite materials N83-12164

CONTACT POTENTIALS
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461

CONTINENTAL SHELVES
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 12: Biological studies
[PB82-185638] N83-12839
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 13: Biological studies
[PB82-185646] N83-12840
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 16: Biological studies
[PB82-185653] N83-12841

CONTINUUM FLOW
The continuous flow analyzer automation system. Part 1: Functional specifications
[PB82-191081] N83-12404

CONTROL
Advanced communication system studies
[AD-A118561] N83-12317

CONTROL EQUIPMENT
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] N83-13008

CONTROL SURFACES
Design, fabrication and test of graphite/polyimide composite joints and attachments --- spacecraft control surfaces
[NASA-CR-165955] N83-12450
Control systems for horizontal-axis wind turbines N83-12532

CONTROL THEORY
Minimax linear estimtion and control
[AD-A106983] N83-12960

CONTROLLABILITY
Hybrid LTA vehicle controllability as affected by buoyancy ratio
[NASA-CR-152344] N83-12099

CONTROLLERS
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098

CONVECTION CLOUDS
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions --- GARP Atlantic Tropical Experiment (GATE) N83-12733

CONVECTION CURRENTS
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723

CONVECTIVE FLOW
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] N83-12386

CONVERGENCE
Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930

CONVERGENT-DIVERGENT NOZZLES
Unsteady transonic flow in a two-dimensional diffuser
[AD-A118473] N83-12052

COOK INLET (AK)
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710

COOLANTS
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360
COOLING
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525
COORDINATE TRANSFORMATIONS
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
COORDINATES
Notes on coordinate generation: Fundamental ideas N83-12376
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] N83-12522
COPPER
Industrial ion source technology
[NASA-CR-159877] N83-12259
COPPER ALLOYS
Some studies on the aluminium alloy formation during sintering of metal powders N83-12230
CORN
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
CORRIDORS
Towards wind-aided flame spread along a horizontal charring slab: The steady-flow problem
[PB82-183732] N83-12282
CORROSION
Recent advances in carbon-carbon materials systems N83-12162
Tribology N83-12167
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
CORROSION RESISTANCE
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224
COSMIC RAYS
Calculation of cosmic-ray induced soft upsets and scaling in VLSI devices
[AD-A118584] N83-12871
COSMOLOGY
Isotopic-abundance ratios and Dirac's large-numbers hypothesis
[DE82-020194] N83-13043
COST ANALYSIS
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520
Managing Federal information resources: Report under the Paperwork Reduction Act of 1980
[PB82-194473] N83-13037
COST ESTIMATES
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520
COUNTERS
Signal processing by counters and digital processing of LDA signals N83-12419
COVARIANCE
Computational modeling of multispectral remote sensing systems: Background investigations
[NASA-CR-165974] N83-12394
CRACK PROPAGATION
Improved methods for predicting spectrum loading effects. Volume 1: Technical summary
[AD-A118856] N83-12077
Improved methods for predicting spectrum loading effects. Volume 2: Test data
[AD-A118857] N83-12078
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Finite element models for predicting crack growth characteristics in composite materials
[NASA-CR-169478] N83-12213
PV module degradation-analysis
[DE82-021123] N83-12570
CRACKING (FRACTURING)
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
CRASHES
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
CRATERS
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
CREEP RUPTURE STRENGTH
Orientation dependence of the stress rupture properties of Nickel-base superalloy single crystals
[NASA-CR-165394] N83-13009
CRITERIA
Background parameters of atmospheric precipitation chemical composition as siting criteria for global monitoring stations N83-12646
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058
CROP GROWTH
Second generation crop yield models review
[E83-10003] N83-12483
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488
Use of climatic information for land use planning and crop diversification --- in Africa N83-12742
The role of climatological information in the protection of plants and animals N83-12746
Agrometeorological monitoring for crop prediction N83-12747
Climatological aspects of in-harvest and post-harvest losses N83-12749
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750
CROP IDENTIFICATION
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
Rice scene radiation research plan N83-12496
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
CROP INVENTORIES
Second generation crop yield models review
[E83-10003] N83-12483
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee
[E83-10006] N83-12486
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data --- South Dakota
[E83-10008] N83-12487
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491
Winter wheat stand density determination and yield estimates from handheld and airborne scanners --- Montana
[E83-10013] N83-12492
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
Development of advanced acreage estimation methods
[E83-10015] N83-12494
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Missing observations in multiyear rotation sampling designs
[E83-10022] N83-12505
CROP VIGOR
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482
Climatological aspects of in-harvest and post-harvest losses N83-12749
CROSS CORRELATION
The statistical relations among Q, Kp, and the Global Weather Central -K indices
[AD-A118724] N83-12700
CROSS POLARIZATION
SP mountain data analysis
[NASA-CR-169471] N83-12303
CRYOGENIC WIND TUNNELS
Flow visualiztion in a cryogenic wind tunnel using holography
[NASA-TM-84556] N83-12395
CRYSTAL DEFECTS
Structure and electronic studies of defects in amorphous silicon
[DE82-018226] N83-13021
CRYSTAL GROWTH
Materials processing in space N83-12166
Manufacturing methods and technology engineering for growth of large diameter Nd: YAG laser crystals
[AD-A118748] N83-13019
CRYSTAL OSCILLATORS
High performance crystal oscillator development
[AD-A118764] N83-12339
CRYSTAL STRUCTURE
The correlation of nitrocellulose properties and cellulose feedstock crystal structure
[AD-A118677] N83-13012
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017
CRYSTALS
Fracture analysis of crystalline rocks: Field measurements and field geomechanical techniques
[PB82-176678] N83-12712
Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011
CULTIVATION
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
CULTURE TECHNIQUES
Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system --- staining cell structures N83-12645
CUMULUS CLOUDS
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 3: S- and C-band radar observations in support of FACE-2
[PB82-183179] N83-12816
CURRENT SHEETS
Analytical and numerical study of resisting sheets and scattering from particles
[AD-A111240] N83-12933
CURVED PANELS
Thermal control system
[NASA-CASE-GSC-12771-1] N83-12361
CUTTERS
Slack wire strike protection concepts
[AD-A118827] N83-12056
CYBERNETICS
Diagnostic problems with technical systems
[ISSN-0208-5658] N83-12964
CYCLES
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630
Cycles of heavy metal migration in ecosystems of the Sikhote-Alin biospheric region N83-12641
CYCLIC COMPOUNDS
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189
CYCLIC LOADS
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
Performance tests of full span form bridges
[PB82-183039] N83-12475
CYLINDRICAL BODIES
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318
CYLINDRICAL SHELLS
Response of thick cylindrical shells to transient internal loadings
[AD-A118600] N83-12472

D

D REGION
Development of an ion mass spectrometer and sounding rocket system for D-region cluster-ion measurements
[AD-A118752] N83-12191
DAMAGE ASSESSMENT
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept
[AD-A118768] N83-12076

DAMS
Climatic aspects of planning impoundments and hydropower operations N83-12754
DATA ACQUISITION
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica [PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica [PB82-187931] N83-12108
Data collection and analysis for geothermal research [PB82-185430] N83-12390
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Beverly High School, Beverly, Massachusetts [DE82-006236] N83-12543
Data report for the Northeast Residential Experiment Station, Apr. 1982 [DE82-021954] N83-12569
GATE observational strategy: A look in retrospect N83-12726
Summary of the climatological data situation in Africa N83-12741
Application of climate data and information in the management of water resources --- in Africa N83-12755
Methodologies for assessing solar energy potential --- in Africa N83-12758
Manual on the global observing system. Volume 1 (annex to the WMO technical regulations): Global aspects, 1981 edition [WMO-544-VOL-1-ANNEX] N83-12801
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3, summary of data collected 27 Nov. 1978 - 6 Mar. 1979 [GARP-FOR-3] N83-12806
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 3: S- and C-band radar observations in support of FACE-2 [PB82-183179] N83-12816
DATA BASES
Durability of aircraft composite materials N83-12164
Charting utilization requirements for a digital cartographic data base [AD-A118455] N83-12510
JAMPS data table maintenance manual [AD-A118476] N83-12869
An algorithm for reducing acyclic hypergraphs [AD-A118535] N83-12936
DATA COMPRESSION
Compression/depression of images from meteorological satellites for transmission by telephone [INPE-2373-NTE/183] N83-12294
DATA CORRELATION
An interactive model for atmospheric correction in satellite images [INPE-2500-PRE/182] N83-12681
DATA MANAGEMENT
Recent improvements and enhancements to NASTRAN N83-12454
Data integration: Combining real-world and simulation data [AD-A118245] N83-13025
Data management and computation. Volume 1: Issues and recommendations [PB82-188113] N83-13035
DATA PROCESSING
A technical analysis of rehosting the National Aerospace System software [AD-A118828] N83-12069
Development of electrical test procedures for qualification of spacecraft against EID. Volume 1: The CAN test and other relevant data [NASA-CR-165590] N83-12136
Signal transmission via sliprings and telemetry N83-12267
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Signal processing by counters and digital processing of LDA signals N83-12419
Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455
An interactive review system for NASTRAN N83-12456
On restarts in NASTRAN N83-12469
A multi-site magnetotelluric measurement system with real-time data analysis [DE82-020598] N83-12704
A study of meteorological time series. Part 2: Applications of autoregressive models [INPE-2519-PRE/194-PT-2] N83-12717
Hardware description of mass weather dissemination system exploratory engineering model [FAA-RD-82-32] N83-12718
Summary of the climatological data situation in Africa N83-12741
Methodologies for assessing solar energy potential --- in Africa N83-12758
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview [E83-10007] N83-12866
The DE magnetometer preprocessor users guide [NASA-TM-83999] N83-12882
Method of and apparatus for generating an interstitial point in a data stream having an even number of data points [NASA-CASE-MFS-25319-1] N83-12932
Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison [DE81-701030] N83-12962
Data management and computation. Volume 1: Issues and recommendations [PB82-188113] N83-13035
DATA PROCESSING EQUIPMENT
Modernization of the WWMCCS Information System (WIS). Executive summary and main report [AD-A118784] N83-12314
DATA PROCESSING TERMINALS
Operation plan for the data 100/LARS terminal system [E83-10011] N83-12490
DATA REDUCTION
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite [INPE-2549-RPE/422] N83-12692
Sonde experiments for comparative measurements of optical turbulence [AD-A118740] N83-12699
Summary of the climatological data situation in Africa N83-12741
Methodologies for assessing solar energy potential --- in Africa N83-12758
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979 [GARP-FOR-4] N83-12807
Methods of correction for systematic error in point precipitation measurement for operational use [WMO-589] N83-12809
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 6: Cloud-to-ground lightning data for FACE-2 [PB82-183187] N83-12817
Depth estimation in the airborne oceanographic LIDAR postflight bathymetry processor [PB82-188194] N83-12838
A data reduction package for US Army Topographic computers: Hand-held programmable calculators [AD-A118854] N83-12902
DATA RETRIEVAL
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements [NASA-CR-2984] N83-12073
DATA SAMPLING
Missing observations in multiyear rotation sampling designs [E83-10022] N83-12505
Identification and Informative Sample Size [REPT-147] N83-12924
DATA SMOOTHING
Smoothing the extrapolated midpoint rule [DE82-018575] N83-12951
Smoothing of scatterplots [ORION-003] N83-12958
DATA STORAGE
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements [NASA-CR-2984] N83-12073
DATA SYSTEMS
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems [INPE-2533-PRE/199] N83-12296
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
JAMPS data table maintenance manual [AD-A118476] N83-12869
DATA TRANSMISSION
Compression/depression of images from meteorological satellites for transmission by telephone [INPE-2373-NTE/183] N83-12294
Retinally stabilized differential resolution television display [NASA-CASE-JPO-15432-1] N83-12308
Hydrological data transmission [WMO-559] N83-12514
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories [DE82-020120] N83-12915
DEBRIS
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl [NASA-TP-2076] N83-12595
DECISION MAKING
A technical analysis of rehosting the National Aerospace System software [AD-A118828] N83-12069
Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744
Pilot judgment training and evaluation, volume 1 [AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3 [AD-A117508] N83-12855
Information load stress, risk taking and physiological responsivity in a visual-motor task [AD-A118079] N83-12857
Algorithms for program verification [AD-A118570] N83-12894
Data integration: Combining real-world and simulation data [AD-A118245] N83-13025
Allocating R&D resources: A study of the determinants of R&D by character of use [PB82-193343] N83-13026
DECOMPOSITION
Anaerobic digestion of lime sludge [AD-A118502] N83-12656
DEFECTS
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
Development of a system to invert eddy-current data and reconstruct flaws --- circular cylindrical tubes [AD-A118767] N83-12442
Developmental defects of plants as tests in monitoring environmental pollution N83-12644
Role of laser-induced primary-defect formation in optical breakdown in NaCl [DE82-002062] N83-13020
DEFLAGRATION
Deflagration-to-detonation in HMX-based propellants [AD-A118616] N83-12251
DEFORMATION
PMR-15 polyimide modifications for improved prepreg tack [NASA-TM-82951] N83-12175
Nonlinear dynamics of axisymmetric bodies and shells subjected to arbitrary loading [ISSN-0208-5658] N83-12444
DEGRADATION
Antimisting fuel degrader investigation [FAA-CT-82-72] N83-12247
Solar-cell testing and evaluation [DE82-016179] N83-12562
PV module degradation-analysis [DE82-021123] N83-12570
DEGREES OF FREEDOM
An evaluation of the inelastic behaviour of two degree of freedom structures under earthquake loading [TR-9] N83-12258
DEHYDRATION
Reduction of voluntary dehydration during effort in hot environments [NASA-TM-76956] N83-12849
DELAY LINES
A fiber optic beam controller for phased array radars [AD-A118763] N83-12319
DEMOGRAPHY
Climatological aspects of human settlements in Africa N83-12762
DENMARK
Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 N83-12536
DENSITY MEASUREMENT
The neutral particle density field around a satellite [INPE-2504-PRE/185] N83-12126
Evaluation of Chem-Crete [PB82-187808] N83-12284
DEPENDENT VARIABLES
Screening designs for response surface experiments [DE82-020486] N83-12948
DEPTH MEASUREMENT
Depth estimation in the airborne oceanographic LIDAR postflight bathymetry processor [PB82-188194] N83-12838
DESIGN ANALYSIS
ARTS 2A design analysis [FAA-RD-82-54] N83-12064

Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071

DESULFURIZING
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207
Mechanisms of dry SO2 control processes
[PB82-196924] N83-12668

DETONATION
Deflagration-to-detonation in HMX-based propellants
[AD-A118616] N83-12251
Attempts at ultraviolet laser initiation of nitromethane and PETN
[DE82-021253] N83-12430

DEUTERIUM
Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] N83-12997
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001

DIALLYL COMPOUNDS
Singlet-oxygenation of a conjugated diallene: Attempt to prepare a stable divinyl peroxide
[AD-A118772] N83-12192

DIELECTRIC PROPERTIES
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306

DIELECTRICS
Electromagnetic methods of nondestructive evaluation
[AD-A118587] N83-12443
GaAs surface passivation for device applications
[AD-A118777] N83-13014

DIESEL ENGINES
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] N83-12250

DIFFERENTIAL EQUATIONS
Numerical simulation of air pollutant spreading processes by transport equation N83-12629
Determination of biota responses to anthropogenic impacts in the system of background monitoring --- using biological models N83-12633
Starting step size for an ODE solver
[DE82-020422] N83-12904
Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925
The Solution of Initial Value Problems Using Interval Arithmetic. Formulation and Analysis of an Algorithm
[REPT-144] N83-12926
AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945
Differential/algebraic systems and matrix pencils
[DE82-020138] N83-12946
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case
[DE82-020362] N83-12947
Smoothing the extrapolated midpoint rule
[DE82-018575] N83-12951
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002

DIFFERENTIAL PRESSURE
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048

DIFFUSION
Turbine engine materials durability research N83-12163
High temperature catalytically assisted combustion
[AD-A118641] N83-12188
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659

DIFFUSION COEFFICIENT
Eddy diffusion coefficients in the lower thermosphere --- turbulent diffusion
[INPE-2502-PRE/183] N83-12680

DIFFUSIVITY
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215

DIGITAL FILTERS
Instrumentation for LDA signal processing N83-12421

DIGITAL SYSTEMS
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089
Digital solar sensor project for attitude determination
[INPE-2495-PRE/178] N83-12392
Development of an airborne sonic thermometer
[AD-A118774] N83-12400
Digital image interpolators by window methods
[INPE-2498-PRE/181] N83-12929

DIGITAL TECHNIQUES
SP mountain data analysis
[NASA-CR-169471] N83-12303
Signal processing by counters and digital processing of LDA signals N83-12419
Instrumentation for LDA signal processing N83-12421
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
Interpolation methods for multispectral images
[INPE-2450-PRE/148] N83-12923

DIRECTIONAL ANTENNAS
Pointing performance of the 8300 series Datron antennas
[AD-A118660] N83-12311

DISCHARGE COEFFICIENT
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791

DISCRETE ADDRESS BEACON SYSTEM
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297

DISCRIMINANT ANALYSIS (STATISTICS)
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512

DISKS
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193

DISPERSIONS
Measurements in particulate two phaseflows N83-12424
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659
The behavior of LNG vapor clouds: Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] N83-12665
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666

DISPLACEMENT
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
Large displacements and stability analysis of nonlinear propeller structures N83-12460

DISPLAY DEVICES
Computer graphic presentation of conventional cockpit instruments
[ARL-SYS-NOTE-82] N83-12082
An interactive review system for NASTRAN N83-12456
Vision research for flight simulation
[AD-A118721] N83-12860

DISSIPATION
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] N83-12998

DISTILLATION
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] N83-12202

DISTRIBUTION (PROPERTY)
Cirrus particle distribution study, part 8
[AD-A118715] N83-12783
Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon
[PB82-183575] N83-13022

DISTRIBUTION FUNCTIONS
High-level spacecraft charging environments near geosynchronous orbit
[AD-A118791] N83-12130

DIURNAL VARIATIONS
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787

DOCUMENTS
AgRISTARS documents tracking list report
[E83-10019] N83-12502
Computerised book procurement system: System analysis
[PB82-188947] N83-13036

DRAINAGE
Some climatological aspects of the development of drainage systems in urban areas N83-12763

DREDGED MATERIALS
The dredging dilemma: System problems and management solutions
[PB82-184979] N83-12288

DRINKING
Reduction of voluntary dehydration during effort in hot environments
[NASA-TM-76956] N83-12849

DROPS (LIQUIDS)
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

DROUGHT
Possibility of determining drought probability and using it in decision making N83-12738
Strategies for the amelioration of agricultural drought in Africa N83-12745

DURABILITY
Turbine engine materials durability research N83-12163
Durability of aircraft composite materials N83-12164
Durability of spacecraft materials N83-12165

DUST
A new method for study of injurious effect of dust pollution on leaves N83-12637

DYE LASERS
New laser dye systems based on transition metal complexes
[AD-A118699] N83-12426

DYES
Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system --- staining cell structures N83-12645

DYNAMIC CHARACTERISTICS
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter N83-12535
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
Implementation and testing of a suboptimal procedure for attaining control in dynamic optimization problems
[INPE-20508-TDL/098] N83-12917

DYNAMIC CONTROL
Implementation and testing of a suboptimal procedure for attaining control in dynamic optimization problems
[INPE-20508-TDL/098] N83-12917

DYNAMIC LOADS
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
Analysis of the properties of vibroisolating material described using the reological model
[ISSN-0208-5658] N83-12236

DYNAMIC MODELS
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
On some pecularities of diffusion models in inhomogeneneous media N83-12653
Methodologies for assessing windpower potential N83-12759

DYNAMIC PRESSURE
Problems of measurement of dynamic wall pressures N83-12263

DYNAMIC RESPONSE
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097

DYNAMIC STRUCTURAL ANALYSIS
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept
[AD-A118768] N83-12076

Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448
Multichannel maximum entropy method of spectral analysis applied to offshore structures
[PB82-182676] N83-12476

E

E REGION
Proceedings of a Colloquium: Sporadic-E and its implications for Radio Communications
[PB82-186578] N83-12714
EARTH ATMOSPHERE
On possible changes of the global climate --- carbon dioxide increase N83-12624
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions
[PB82-196771] N83-12711
Proceedings of a Colloquium: Sporadic-E and its implications for Radio Communications
[PB82-186578] N83-12714
EARTH CRUST
Spectral properties of minerals and rocks and their applications in geology
[INPE-2515-NTE/192] N83-12691
EARTH ENVIRONMENT
Integrated global monitoring of the environment: Policy and principles N83-12602
The Global Environmental Monitoring System (GEMS): Principles and progress N83-12603
The evolution of carbon dioxide --- in the Earth environment N83-12631
EARTH HYDROSPHERE
Monitoring of world ocean pollution N83-12614
EARTH OBSERVATIONS (FROM SPACE)
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508
EARTH ORBITS
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889] N83-12145
EARTH RESOURCES
Mineral resources: Genetic understanding for practical applications
[PB82-182114] N83-12517
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
EARTH SURFACE
On the mechanisms of the deposition of atmospheric admixtures to the ground surface --- air pollution, aerosols N83-12628
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666
EARTH TIDES
Perturbation of artificial satellites due to tides
[INPE-2388-PRE/108] N83-12124
EARTHQUAKE RESISTANT STRUCTURES
An evaluation of the inelastic behaviour of two degree of freedom structures under earthquake loading
[TR-9] N83-12258
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
ECHOES
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302
ECOLOGY
Scientific aspects of the organization of biological monitoring of the Baltic Sea ecosystem state N83-12635
Organochlorine pesticides in organisms of wild animals of terrestrial ecosystems --- in the U.S.S.R. N83-12636
Study of pollutant impact on freshwater ecosystems N83-12639
Cycles of heavy metal migration in ecosystems of the Sikhote-Alin biospheric region N83-12641
Mathematical bases for modeling exogenic succession --- in an ecological system N83-12652
ECONOMETRICS
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589
ECONOMIC ANALYSIS
Research overview and analysis
[AD-A118594] N83-12280
Solar thermal industry status and future needs
[DE82-020885] N83-12546
ECONOMIC FACTORS
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751
ECOSYSTEMS
Determination of biota responses to anthropogenic impacts in the system of background monitoring --- using biological models N83-12633
Exchange of carbon dioxide between a forest and the atmosphere
[DE82-020061] N83-12656
Persistence in model ecosystems
[PB82-196916] N83-12669
EDDY CURRENTS
Development of a system to invert eddy-current data and reconstruct flaws --- circular cylindrical tubes
[AD-A118767] N83-12442
Electromagnetic methods of nondestructive evaluation
[AD-A118587] N83-12443
EDGES
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
EDUCATION
Addendum to guidelines for the education and training of personnel in meteorology and operational hydrology. Part 2: Education and training of personnel in operational hydrology
[WMO-258] N83-12481
Manpower resources in Africa: Training requirements and opportunities --- meteorological services N83-12765
Compendium of training facilities for meteorology and operational hydrology
[WMO-240-REV] N83-12810
EIGENVALUES
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016
EJECTORS
Characteristics of high performance ejectors
[AD-A118720] N83-12095
ELASTIC DEFORMATION
Surface instabilities on an equibiaxially stretched elastic half-space
[TR-7] N83-12447
ELASTIC PROPERTIES
Advances in nondestructive evaluation technology N83-12169
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459
ELASTOHYDRODYNAMICS
Elastohydrodynamic lubrication theory
[NASA-TM-81695] N83-12432
ELASTOPLASTICITY
Nonlinear dynamics of axisymmetric bodies and shells subjected to arbitrary loading
[ISSN-0208-5658] N83-12444
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462
ELECTRIC AUTOMOBILES
Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021216] N83-12582
Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981
[DE82-021143] N83-12583
Verification tests of the Lectra Motors Corporation Lectra 2+2
[AD-A118718] N83-13040
ELECTRIC BATTERIES
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573
ELECTRIC CONTACTS
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435
ELECTRIC CURRENT
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
PV module degradation-analysis
[DE82-021123] N83-12570
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] N83-13005
ELECTRIC FIELDS
Electrical fields at stratospheric balloon altitudes
[INPE-2556-TDL/103] N83-12690
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
The design, assembly and operation of an electric field dominated plasma facility
[AD-A118557] N83-13000
ELECTRIC FILTERS
Filter characterization
[DE82-020468] N83-12903
ELECTRIC MOTOR VEHICLES
Testing of the permanent magnet material Mn-Al-C for potential use in propulsion motors for electric vehicles
[NASA-CR-169481] N83-12329
ELECTRIC POTENTIAL
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
Methodologies for assessing windpower potential N83-12759
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] N83-13005
Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon
[PB82-183575] N83-13022
ELECTRIC POWER PLANTS
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects. Volume 3. Utility load management project
[DE82-007247] N83-12559
ROSET: A solar-thermal electric-power simulation users guide
[DE82-021997] N83-12567
ELECTRIC PROPULSION
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889] N83-12145
ELECTRICAL MEASUREMENT
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042
ELECTRICAL PROPERTIES
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010
ELECTRICAL RESISTANCE
Reactanceless bandpass amplifier
[NASA-CASE-GSC-12788-1] N83-12333
Analytical and numerical study of resisting sheets and scattering from particles
[AD-A111240] N83-12933
ELECTRICAL RESISTIVITY
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010
ELECTRIFICATION
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042
ELECTRO-OPTICS
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992
ELECTROCHEMISTRY
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194

Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments
[AD-A118710] N83-12197
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198

ELECTRODEPOSITION
Improved electrodeposited low contraction chromium
[AD-A118678] N83-12219
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012426] N83-12552

ELECTRODES
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Simulation of the dropping mercury electrode by orthogonal collocation
[AD-A118689] N83-12187
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations
[AD-A118707] N83-12195
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments
[AD-A118710] N83-12197
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
Development of a high-rate insoluble zinc electrode for alkaline batteries
[DE82-020608] N83-12572

ELECTROLYTES
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573

ELECTROLYTIC CELLS
High efficiency lithium-thionyl chloride cell
[AD-A118696] N83-12537

ELECTROMAGNETIC COMPATIBILITY
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318

ELECTROMAGNETIC NOISE
Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual
[PB82-178989] N83-12345

ELECTROMAGNETIC PROPERTIES
Electromagnetic methods of nondestructive evaluation
[AD-A118587] N83-12443

ELECTROMAGNETIC PROPULSION
Rail accelerator research at Lewis Research Center
[NASA-TM-83015] N83-12143

ELECTROMAGNETIC PULSES
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283

ELECTROMAGNETIC RADIATION
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 2. Users manual
[AD-A118497] N83-12324
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 3. Computer codes
[AD-A118498] N83-12325
Spectral properties of minerals and rocks and their applications in geology
[INPE 2515-NTE/192] N83-12691
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions
[PB82-198771] N83-12711

ELECTROMAGNETIC SCATTERING
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 3. Computer codes
[AD-A118498] N83-12325

ELECTRON ACCELERATORS
Injection of a high current beam into a modified betatron accelerator
[AD-A118581] N83-12980
FX-25 and FX-100 propagation experiments
[AD-A118755] N83-12981

ELECTRON DENSITY (CONCENTRATION)
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

ELECTRON DENSITY PROFILES
Comparison of ionospheric electron density profiles obtained with the International Reference Ionosphere (IRI) 79 model and observed at Cachoeira Paulista
[INPE-2540-PRE/202] N83-12688

ELECTRON ENERGY
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

ELECTRON RECOMBINATION
Structure and electronic studies of defects in amorphous silicon
[DE82-018228] N83-13021

ELECTRON-ION RECOMBINATION
Dielectronic recombination of hydrogenic ions
[IPPJ-AM-23] N83-12977

ELECTRONIC CONTROL
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089

ELECTRONIC EQUIPMENT
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083
Simplification of power electronics for ion thruster neutralizers
[NASA-TM-83004] N83-12141
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296
RADC thermal guide for reliability engineers
[AD-A118839] N83-12338
Evaluation selection of encapsulating plastics for ordnance electronic assemblies
[AD-A118714] N83-12341
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428

ELECTRONS
Development of electrical test procedures for qualification of spacecraft against EID. Volume 1: The CAN test and other relevant data
[NASA-CR-165590] N83-12136

ELECTROPHORESIS
Materials processing in space N83-12166

ELECTROSTATIC CHARGE
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042

ELECTROSTATICS
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335

EMISSION
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001

EMISSION SPECTRA
A software system for emission spectrometry
[NASA-TM-83001] N83-12181
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4
[NASA-TM-84929] N83-13047

ENCAPSULATING
Evaluation selection of encapsulating plastics for ordnance electronic assemblies
[AD-A118714] N83-12341

ENERGETIC PARTICLES
High-level spacecraft charging environments near geosynchronous orbit
[AD-A118791] N83-12130
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321

ENERGY CONSERVATION
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
Energy conservation strategy for the 1980's
[GPO-86-217] N83-12521
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects. Volume 3. Utility load management project
[DE82-007247] N83-12559
Secretary's report to Congress. Secretary's statement, program review and outlook
[DE82-021878] N83-12581
Industrial energy use, volume 2
[PB82-200593] N83-12593

ENERGY CONSUMPTION
Earth-covered buildings: An exploratory analysis for hazard and energy performance
[PB82-189564] N83-12285
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] N83-12590
A review of the Energy Productivity Center's least cost energy strategy study
[PB82-188111] N83-12591
Industrial energy use, volume 2
[PB82-200593] N83-12593

ENERGY CONVERSION
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480
Cell module and fuel conditioner development
[NASA-CR-165462-A] N83-12524
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526
General introduction to wind energy conversion
[NLR-MP-81014-U] N83-12527
Site characteristics for wind energy conversion devices N83-12528
Horizontal and vertical axis wind turbines N83-12529
Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 N83-12536
Methodologies for assessing windpower potential N83-12759

ENERGY CONVERSION EFFICIENCY
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563

ENERGY DISSIPATION
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002

ENERGY POLICY
Energy conservation strategy for the 1980's
[GPO-86-217] N83-12521
Secretary's report to Congress. Secretary's statement, program review and outlook
[DE82-021878] N83-12581
A review of the Energy Productivity Center's least cost energy strategy study
[PB82-188111] N83-12591

ENERGY REQUIREMENTS
Earth-covered buildings: An exploratory analysis for hazard and energy performance
[PB82-189564] N83-12285

ENERGY STORAGE
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design
[DE82-019781] N83-12561
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585

ENERGY TECHNOLOGY
Modular small hydro configuration
[PB82-184953] N83-12327
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480

ENERGY TRANSFER
Theoretical study of state-to-state collisions
[AD-A118586] N83-12979

ENGINE CONTROL
Computer program for a four-cylinder-Stirling-engine controls simulation
[NASA-TM-82774] N83-12359

ENGINE DESIGN
Research and development of lift-jet engine, 1 --- v/stol aircraft
[NAL-TR-699] N83-12084
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085

Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines
[NASA-CR-169475] N83-12088
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089
Rotorcraft convertible engines for the 1980s
[NASA-TM-83003] N83-12091
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165178] N83-12431
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165329] N83-13038

ENGINE FAILURE
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433

ENGINE NOISE
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973

ENGINE PARTS
Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines
[NASA-CR-169475] N83-12088
High-temperature fatigue in metals N83-12159
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-168474] N83-12214

ENGINE TESTS
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092

ENTHALPY
Heat of mixing apparatus for liquefied gases
[PB82-195645] N83-12403

ENVIRONMENT EFFECTS
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542
Draft supplement to final environmental impact statement, Space Shuttle program, Vandenberg AFB, California N83-12598
Study of pollutant impact on freshwater ecosystems N83-12639
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753
Geophysical monitoring for climatic change no. 9
[PB82-193061] N83-12813
Area equivalent method: A quick procedure for determining noise impact at civilian airports
[PB82-195892] N83-12975

ENVIRONMENT POLLUTION
Durability of aircraft composite materials N83-12164
On the Development of Multimedia Monitoring of Environmental Pollution --- conferences
[WMO-563] N83-12599
Main principles of monitoring the natural environment and climate --- pollution effects N83-12600
Basic principles and siting criteria for multimedia monitoring --- of environmental pollutants N83-12601
The Global Environmental Monitoring System (GEMS): Principles and progress N83-12603
Monitoring of the biosphere biological component --- environment pollution N83-12605
Material on the background integrated monitoring of natural environmental pollution --- in the U.S.S.R. N83-12609
Monitoring of meteorological elements in a composite program for environmental pollution studies N83-12648
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981
[WMO-586] N83-12805

ENVIRONMENT PROTECTION
Smoke management: A workbook for balancing air quality and land management goals
[PB82-188830] N83-12673

ENVIRONMENTAL CHEMISTRY
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom --- insecticides in the food chain N83-12634

ENVIRONMENTAL ENGINEERING
The physical working environment and its effect on productivity in offices
[PB82-186461] N83-12862

ENVIRONMENTAL MONITORING
On the Development of Multimedia Monitoring of Environmental Pollution --- conferences
[WMO-563] N83-12599
Main principles of monitoring the natural environment and climate --- pollution effects N83-12600
Basic principles and siting criteria for multimedia monitoring --- of environmental pollutants N83-12601
Integrated global monitoring of the environment: Policy and principles N83-12602
The Global Environmental Monitoring System (GEMS): Principles and progress N83-12603
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606
Chemical and isotope analysis of trace pollutants in different environmental media N83-12612
Marine environmental monitoring requirements: Integrated global monitoring N83-12613
Integrated global monitoring of the environment: Practical considerations N83-12617
Some principles of the interaction of a global monitoring system with national and regional natural environment pollution observation and information systems N83-12622
Study of pollutant migration and transformation --- environmental monitoring in the U.S.S.R. N83-12623
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630
Determination of biota responses to anthropogenic impacts in the system of background monitoring --- using biological models N83-12633
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom --- insecticides in the food chain N83-12634
Scientific aspects of the organization of biological monitoring of the Baltic Sea ecosystem state N83-12635
Monitoring of meteorological elements in a composite program for environmental pollution studies N83-12648
Geophysical monitoring for climatic change no. 9
[PB82-193061] N83-12813

ENVIRONMENTAL SURVEYS
Draft supplement to final environmental impact statement, Space Shuttle program, Vandenberg AFB, California N83-12598

EPITAXY
HgCdTe fabrication using directed energy techniques
[AD-A118654] N83-13013

EQUATIONS OF MOTION
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050

EQUATORIAL ORBITS
Effects of motion of the equatorial plane on equatorial elements of an Earth satellite
[NAL-TR-695] N83-12120

EQUATORIAL REGIONS
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
Electrical fields at stratospheric balloon altitudes
[INPE-2556-TDL/103] N83-12690
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695

EQUILIBRIUM FLOW
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260

EQUIPMENT SPECIFICATIONS
Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines
[NASA-CR-169475] N83-12088

ERROR ANALYSIS
Evaluation and reduction of errors induced by the Guyan transformation N83-12468
Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration
[NASA-CR-169476] N83-12880
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890

ERROR CORRECTING CODES
Evaluation and reduction of errors induced by the Guyan transformation N83-12468

ERROR CORRECTING DEVICES
Methods of correction for systematic error in point precipitation measurement for operational use
[WMO-589] N83-12809

ERRORS
Detection of faulty inspection
[AD-A118549] N83-12441

ESCAPE VELOCITY
Optimal low-thrust Earth escape spiral trajectories from geosynchronous orbit
[NAL-TR-704] N83-12121

ESTIMATES
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209

ESTIMATING
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906
Study of problems of ill-conditioned regression in the presence of multicollinearity
[INPE-2401-PRE/115] N83-12921
A randomized solution for multi-Bayes estimates of the multinormal mean
[TR-69] N83-12952
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954
Three-Bayesian estimation of a multinormal mean: An example
[TR-72] N83-12956
Minimax linear estimtion and control
[AD-A106983] N83-12960

ETCHING
Industrial ion source technology
[NASA-CR-159877] N83-12259

ETHANE
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571

ETHYL ALCOHOL
Flame propagation analysis of water-alcohol mixtures
[INPE-2548-PRE/205] N83-12180
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] N83-12250
Status of alcohol-fuels-utilization technology for highway transportation: A 1981 perspective. Volume 1. Spark-ignition engines
[DE82-020493] N83-12255

ETHYLENE
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186

EULER EQUATIONS OF MOTION
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375

EVALUATION
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890
Filter characterization
[DE82-020466] N83-12903
Evaluation of technology assessments and development of evaluation protocols, project report
[PB82-197393] N83-13027

EVAPORATION
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525

EXCRETION
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat
[NASA-TM-76955] N83-12848

EXHAUST EMISSION
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] N83-12250

EXOTHERMIC REACTIONS
Thermal control system
[NASA-CASE-GSC-12771-1] N83-12361

EXPANSION
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520

EXPERIMENTAL DESIGN
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
First planning meeting for the typhoon operational experiment (TOPEX) --- Tokyo, 17-26 Jun. 1980
[WMO-565] N83-12789
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979
[GARP-FOR-1] N83-12794

EXPLOITATION
International issues N83-12118

EXPLORATION
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513
Geothermal power development in Hawaii. Volume 1. Review and analysis
[DE82-020077] N83-12544

EXPOSURE
The effect of the thermal conditions of training and testing on the performance of motor tasks measuring primary manual abilities
[AD-A118275] N83-12859

EXTINCTION
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407

EXTINGUISHING
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205

EXTRAPOLATION
Smoothing the extrapolated midpoint rule
[DE82-018575] N83-12951

EXTRAVEHICULAR ACTIVITY
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132

F

F-106 AIRCRAFT
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063
F-106 tow system (IOT&E)
[AD-A118527] N83-12074

FABRY-PEROT INTERFEROMETERS
Further developments in laser anemometry N83-12423

FACTORIAL DESIGN
Screening designs for response surface experiments
[DE82-020486] N83-12948

FACTORIZATION
Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925

FAILURE ANALYSIS
Tribology N83-12167
Advances in nondestructive evaluation technology N83-12169
Failure characteristics of graphite-epoxy structural components loaded in compression
[NASA-TM-84552] N83-12174
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433

FAIRINGS
Slack wire strike protection concepts
[AD-A118827] N83-12056

FAN BLADES
Blade pressure measurements N83-12275

FAR FIELDS
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973

FATIGUE (MATERIALS)
Fatigue and fracture research in metals N83-12158
Field tests of a continuous twin girder steel bridge
[PB82-185901] N83-12477

FATIGUE LIFE
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Fatigue and fracture research in composite materials N83-12152
High-temperature fatigue in metals N83-12159
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212

FATIGUE TESTS
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071

FAULT TOLERANCE
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868

FAULTS
Detection of faulty inspection
[AD-A118549] N83-12441

FEASIBILITY ANALYSIS
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
The climate of Africa, including feasibility study of climate alert system N83-12737

FEDERAL BUDGETS
Aeronautics research and technology. A review of proposed reductions in the FY 1983 NASA program
[NASA-CR-169386] N83-13024
Managing Federal information resources: Report under the Paperwork Reduction Act of 1980
[PB82-194473] N83-13037

FEEDBACK CONTROL
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286

FERROGRAPHY
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433

FERROMAGNETISM
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457

FIBER COMPOSITES
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172
Method and apparatus for gripping uniaxial fibrous composite materials --- holding specimens for mechanical property testing
[NASA-CASE-LEW-13758-1] N83-12176

FIBER OPTICS
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
Ranging system --- industrial robotics
[NASA-CASE-NPO-15865-1] N83-12991

FIBER REINFORCED COMPOSITES
Concrete composites. Fiber reinforced polymer concretes: Properties and principles of use
[ISSN-0208-5658] N83-12171
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179

FIBERS
The correlation of nitrocellulose properties and cellulose feedstock crystal structure
[AD-A118677] N83-13012

FIGHTER AIRCRAFT
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept
[AD-A118768] N83-12076
Polymer materials research at NASA Ames Research Center N83-12150
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973

FILE MAINTENANCE (COMPUTERS)
JAMPS data table maintenance manual
[AD-A118476] N83-12869

FILM COOLING
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360

FILM THICKNESS
A nonintrusive laser interferometer method for measurement of skin friction
[NASA-TM-84300] N83-12393

FINITE DIFFERENCE THEORY
Numerical methods for two- and three-dimensional viscous flows N83-12378
The computation of transonic potential flow N83-12379

FINITE ELEMENT METHOD
Integrated finite element thermal-structural analysis with radiation heat transfer
[NASA-TM-84469] N83-12356
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435
Nonlinear dynamics of axisymmetric bodies and shells subjected to arbitrary loading
[ISSN-0208-5658] N83-12444
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452
Operating in the age of NASTRAN N83-12453
Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455
An interactive review system for NASTRAN N83-12456
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459
Large displacements and stability analysis of nonlinear propeller structures N83-12460
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
Finite element solution of torsion and other 2-D Poisson equations N83-12463
A fast hidden line algorithm for plotting finite element models
[NASA-TM-83981] N83-12879

FINS
Processing composite materials N83-12153

FIRE DAMAGE
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237

FIRE PREVENTION
New directions in office planning: The influence of the fire properties of materials and components on fire safety
[PB82-191214] N83-12290

FIRES
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237
Towards wind-aided flame spread along a horizontal charring slab: The steady-flow problem
[PB82-183732] N83-12282
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461

FITTING
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906
FITS: A function fitting program
[DE82-021259] N83-12907

FLAME PROPAGATION
Experiments on the aft-end ignition of solid propellant rocket
[NAL-TR-694] N83-12139
Flame propagation analysis of water-alcohol mixtures
[INPE-2548-PRE/205] N83-12180
Towards wind-aided flame spread along a horizontal charring slab: The steady-flow problem
[PB82-183732] N83-12282

FLAMES
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Measurements in gas flows and flames N83-12420

FLAMMABILITY
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
New directions in office planning: The influence of the fire properties of materials and components on fire safety
[PB82-191214] N83-12290

FLAT PLATES
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586

FLEXIBLE SPACECRAFT
Conditions of attitude stability for a flexible satellite
[INPE-2389-PRE/109] N83-12125
Flexible satellite orientation, using the modal-analysis method for gyroscopic systems
[INPE-2505-PRE/186] N83-12127

FLEXING
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471

FLIGHT CHARACTERISTICS
Aircraft flight procedure program: Data base development
[PB82-183740] N83-12040
Aircraft flight procedure program: Modified computer program model, user's manual
[PB82-183757] N83-12041

FLIGHT HAZARDS
Definition of Alaskan Aviation training requirements N83-12852

FLIGHT INSTRUMENTS
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083
FLIGHT PATHS
Aircraft flight procedure program: Data base development
[PB82-183740] N83-12040
Aircraft flight procedure program: Modified computer program model, user's manual
[PB82-183757] N83-12041
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895
FLIGHT PLANS
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895
FLIGHT SAFETY
Radar analysis for severe weather detection and tracking
[FAA-RD-82-64] N83-12719
FLIGHT SIMULATION
Vision research for flight simulation
[AD-A118721] N83-12860
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968
FLIGHT SIMULATORS
A visual technology research simulator for Vertical Take Off and Landing (VTOL)
[AD-A115626] N83-12103
Research Issues in the Determination of Simulator Fidelity: Proceedings of the ARI sponsored Workshop
[AD-A118253] N83-12106
FLIGHT TESTS
Preliminary evaluation of the basic experimental active Beacon Collision Avoidance System (BCAS)
[DOT/FAA-RD-82-67] N83-12058
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico
[FAA-RD-82-7] N83-12059
Development of an airborne sonic thermometer
[AD-A118774] N83-12400
FLIGHT TRAINING
Definition of Alaskan Aviation training requirements N83-12852
FLOOD PREDICTIONS
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
FLOODS
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
Focusing mechanisms in the Texas flash floods of 1978
[PB82-185380] N83-12822
FLOORS
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
FLOW CHARACTERISTICS
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043
Advanced technologies for turbomachinery systems: An overview
[NASA-TM-82949] N83-12090
Measurements in particulate two phaseflows N83-12424
FLOW DISTRIBUTION
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
An experimental and analytical study on spray flow field by liquid/gas coaxial injector elements (I)
[NAL-TR-692] N83-12346
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363
Measurements in gas flows and flames N83-12420
FLOW GEOMETRY
Notes on coordinate generation: Fundamental ideas N83-12376
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
FLOW MEASUREMENT
Introduction to laser anemometry studies in turbomachinery N83-12268
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270
Laser Doppler measurements in transparent pump impellers N83-12272
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
Blade pressure measurements N83-12275
Experimental investigation of transport of discrete solids with surge flows in a 10.0 cm diameter partially filled pipe
[PB82-178724] N83-12389
The continuous flow analyzer automation system. Part 1: Functional specifications
[PB82-191081] N83-12404
Laser Velocimetry
[VKI-LS-1981-3] N83-12408
Optical systems in laser anemometry N83-12409
Adaptation of laser velocimeters to various applications N83-12410
High velocity measurements: Special requirements N83-12411
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791
FLOW STABILITY
On higher eigenstates of Goertler instability in compressible flow
[NASA-CR-169480] N83-12355
FLOW VELOCITY
Laser Doppler measurements in transparent pump impellers N83-12272
Experimental investigation of transport of discrete solids with surge flows in a 10.0 cm diameter partially filled pipe
[PB82-178724] N83-12389
Laser Velocimetry
[VKI-LS-1981-3] N83-12408
High velocity measurements: Special requirements N83-12411
Measurements in gas flows and flames N83-12420
Further developments in laser anemometry N83-12423
FLOW VISUALIZATION
Flow visualiztion in a cryogenic wind tunnel using holography
[NASA-TM-84556] N83-12395
FLOWMETERS
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
FLUE GASES
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207
Mechanisms of dry SO2 control processes
[PB82-196924] N83-12668
FLUID DYNAMICS
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement of non-steady fluid dynamic quantities N83-12262
Stewartson's triple deck
[AD-A118617] N83-12381
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
FLUID FLOW
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
Numerical computation of multi-phase fluid flow and heat transfer N83-12367
FLUID MECHANICS
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
FLUIDIZED BED PROCESSORS
Fluidised-bed combustion: Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] N83-12204
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571
FLUIDS
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
FLUORESCENCE
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
FLUTTER
Application of Zimmerman flutter-margin criterion to a wind tunnel model
[NASA-TM-84545] N83-12070
FLUTTER ANALYSIS
Application of Zimmerman flutter-margin criterion to a wind tunnel model
[NASA-TM-84545] N83-12070
FLUX (RATE)
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
FLUX DENSITY
Scatterplate flux mapping for solar concentrators
[DE82-021359] N83-12588
Exchange of carbon dioxide between a forest and the atmosphere
[DE82-020061] N83-12658
FOAMS
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177
FOOD CHAIN
Persistence in modal ecosystems
[PB82-196916] N83-12669
FORECASTING
Long-range water supply forecasting
[WMO-587] N83-12516
Prediction of range production from weather records in Africa — livestock breeding N83-12748
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
FOREST FIRES
Static testing to evaluate airtanker delivery performance — distribution of flame retardants in forest fires
[PB82-179946] N83-12079
Smoke management: A workbook for balancing air quality and land management goals
[PB82-188830] N83-12673
FOREST MANAGEMENT
Smoke management: A workbook for balancing air quality and land management goals
[PB82-188830] N83-12673
FORESTS
Exchange of carbon dioxide between a forest and the atmosphere
[DE82-020061] N83-12658
FORMALDEHYDE
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12162
FORMALISM
Algorithmic complexity, volume 2
[AD-A118814] N83-12892
FORMAT
Evaluation of technology assessments and development of evaluation protocols, project report
[PB82-197393] N83-13027
Evaluation of technology assessments and development of evaluation protocols
[PB82-197385] N83-13028
FORMING TECHNIQUES
Advances in metals processing N83-12157
Fundamental investigations of superplastic forming processes
[AD-A118614] N83-12220
FORTRAN
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685
Burroughs Corporation large systems FORTRAN 77
[PB82-183153] N83-12872
Validation summary report; NCR Corporation V8570 VRX FORTRAN 10
[PB82-183641] N83-12877
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting
[NASA-TM-81374] N83-12881
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12906
Burroughs Corporation CP9572 CSM system COBOL release
[PB82-186933] N83-12910
The MODCOMP NASA extened FORTRAN 78
[PB82-183146] N83-12912

FOSSIL FUELS
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] N83-12202
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672

FOULING
A guide to the principal marine fouling organisms, with particular reference to Cockburn Sound, Western Australia
[MRL-R-858] N83-12842

FOUNDATIONS
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12888

FOURIER TRANSFORMATION
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations
[AD-A118707] N83-12195
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992

FRACTIONATION
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595

FRACTURE MECHANICS
Fatigue and fracture research in metals N83-12158
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Fracture analysis of PVC pipe materials
[R81-7] N83-12240
Fracture analysis of crystalline rocks: Field measurements and field geomechanical techniques
[PB82-176678] N83-12712

FRACTURE STRENGTH
Fatigue and fracture research in composite materials N83-12152
A single specimen J-based fracture toughness test for high strength steels
[AD-A118674] N83-12218
Fracture analysis of PVC pipe materials
[R81-7] N83-12240

FRACTURING
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480

FRAMES
Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448

FREE BOUNDARIES
The transiton and dynamics of bounded and free shear layers
[AD-A118665] N83-12380

FREE ELECTRON LASERS
Intense relativistic electron beam investigations
[AD-A118664] N83-12978

FREE FLOW
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048

FREE RADICALS
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182

FREON
Use of Freon for in-place filter testing
[DE82-008030] N83-12660

FREQUENCIES
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889

FREQUENCY ANALYZERS
Introduction to LDA signal analysis and signal processing N83-12418

FREQUENCY HOPPING
Frequency hopping, multiple frequency-shift keying, coding, and optimal partial-band jamming
[AD-A118585] N83-12320

FREQUENCY MODULATION
Data transmitters and command receiver development
[AD-A118739] N83-12322

FREQUENCY SHIFT
Further developments in laser anemometry N83-12423

FREQUENCY SHIFT KEYING
Frequency hopping, multiple frequency-shift keying, coding, and optimal partial-band jamming
[AD-A118585] N83-12320

FRESH WATER
Study of pollutant impact on freshwater ecosystems N83-12639

FRICTION
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098
Tribology N83-12167
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435

FUEL CELLS
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573
Metal chelate catalysts for fuel cells
[PB82-195637] N83-12592

FUEL CONSUMPTION
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094
Efficiency improved turboprop
[AD-A118819] N83-12096
Assessment of current and projected future trends in light-duty-vehicle fuel switching. Subtask 1
[DE82-018816] N83-12440

FUEL INJECTION
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

FUEL PRODUCTION
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542

FUEL PUMPS
Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247

FUEL-AIR RATIO
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358

FUNCTIONAL DESIGN SPECIFICATIONS
The continuous flow analyzer automation system. Part 1: Functional specifications
[PB82-191081] N83-12404
PASCAL compiler functional specification
[PB82-183989] N83-12876

FUNCTIONS (MATHEMATICS)
FITS: A function fitting program
[DE82-021259] N83-12907

FUSION WELDING
Heat source: Materials interactions during fusion welding
[AD-A118776] N83-12436

G

GALLIUM ARSENIDES
GaAs surface passivation for device applications
[AD-A118777] N83-13014
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

GAME THEORY
Soviet mathematical programming
[AD-A116970] N83-12934

GAMMA RAY ASTRONOMY
The future of high energy gamma ray astronomy and its potential astrophysical implications
[NASA-TM-83986] N83-13042

GAMMA RAY SPECTROMETERS
GAMIDEN: A program to aid in the identification of unknown materials by gamma-ray spectroscopy
[DE82-021960] N83-12203
Ge(Li) telescope for observing atmospheric gamma ray lines in the Southern Hemisphere
[INPE-2513-PRE/192] N83-12686

GAMMA RAY TELESCOPES
Ge(Li) telescope for observing atmospheric gamma ray lines in the Southern Hemisphere
[INPE-2513-PRE/192] N83-12686

GAMMA RAYS
Possibility of detecting the nuclear gamma line at 6.13 MeV of atmospheric and cosmic origin O(16) --- line spectra
[INPE-2511-PRE/190] N83-12684
Latitudinal variation of telluric and atmospheric gamma-ray radiation
[INPE-2538-PRE/201] N83-12689

GARP ATLANTIC TROPICAL EXPERIMENT
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
Major tasks of GATE N83-12725
GATE observational strategy: A look in retrospect N83-12726
Large-scale mean state N83-12727
Synoptic-scale motions --- GARP Atlantic Tropical Experiment (GATE) N83-12728
Theoretical studies of tropical waves --- GARP Atlantic Tropical Experiment (GATE) N83-12729
Large-scale numerical modelling --- GARP Atlantic Tropical Experiment (GATE) N83-12730
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
A/B and B scale motion and balances in the ITCZ area --- GARP Atlantic Tropical Experiment (GATE) N83-12732
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions --- GARP Atlantic Tropical Experiment (GATE) N83-12733
Radiation processes and their parameterization --- GARP Atlantic Tropical Experiment (GATE) N83-12734
Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE --- first GARP Global Experiment (FGGE) N83-12735

GAS FLOW
Measurements in gas flows and flames N83-12420

GAS LASERS
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118698] N83-12425

GAS PRESSURE
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358

GAS TURBINE ENGINES
Advanced Gas Turbine (AGT) powertrain system development program --- automobile engines
[NASA-CR-169475] N83-12088
Conservation of strategic metals N83-12154
Solidification process control for advanced superalloys N83-12155
High-temperature fatigue in metals N83-12159
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165178] N83-12431
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165329] N83-13038

GAS TURBINES
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement of non-steady fluid dynamic quantities N83-12262
Measurement techniques for heat transfer in the turbine using short duration wind tunnel techniques N83-12271
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] N83-12437
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971

GAS-LIQUID INTERACTIONS
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708

GAS-METAL INTERACTIONS
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215

GAS-SOLID INTERACTIONS
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials
[NASA-CASE-NPO-15851-1] N83-12986

GASES
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708

GASIFICATION
Fundamental air-gasification engineering parameters
[DE82-021612] N83-12200

GASOLINE
Assessment of current and projected future trends in light-duty-vehicle fuel switching. Subtask 1
[DE82-018816] N83-12440

GATES (CIRCUITS)
Traditional computing center as a modern network node
[DE82-006935] N83-12914

GAW-2 AIRFOIL
An investigation of the aerodynamic characteristics of a new general aviation airfoil in flight
[NASA-CR-169477] N83-12046

GENERAL AVIATION AIRCRAFT
Census of US civil aircraft, calendar year 1981
[AD-A118571] N83-12039
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083

GEOCHEMISTRY
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513

GEODESY
Applications of space science and technology --- Indian space program N83-12115

GEODYNAMICS
The NASA Geodynamics Program report, 1981
[NASA-TM-85126] N83-12702

GEOGRAPHIC INFORMATION SYSTEMS
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project
[E83-10024] N83-12507

GEOLOGICAL SURVEYS
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512
Low- to moderate-temperature geothermal resource assessment for Nevada: Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] N83-12584

GEOLOGY
SP mountain data analysis
[NASA-CR-169471] N83-12303
Remote sensing in geology: Current trends and future prospects with satellite data
[INPE-2514-PRE/193] N83-12509
Spectral properties of minerals and rocks and their applications in geology
[INPE-2515-NTE/192] N83-12691
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713

GEOMAGNETISM
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685
The statistical relations among Q, Kp, and the Global Weather Central -K indices
[AD-A118734] N83-12700
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050

GEOMETRICAL OPTICS
Asymptotic theory of the scattering of axially symmetric reflectors
[INPE-2402-TDL/089] N83-12295

GEOMETRY
Multi-Dimensional continued fraction algorithms
[REPT-145] N83-12928

GEOMORPHOLOGY
Preliminary investigations: Archaeology and sediment geomorphology, navigation pool 12, Upper Mississippi River. Volume 2. Technical documents and site data sheets
[AD-A118798] N83-12698
Aridity in east Africa: Climatic geomorphology of water resources N83-12758

GEOPRESSURE
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708

GEOSYNCHRONOUS ORBITS
Optimal low-thrust Earth escape spiral trajectories from geosynchronous orbit
[NAL-TR-704] N83-12121
High-level spacecraft charging environments near geosynchronous orbit
[AD-A118791] N83-12130

GEOTHERMAL ENERGY UTILIZATION
Data collection and analysis for geothermal research
[PB82-185430] N83-12390
Geothermal reservoir assessment, Roosevelt Hot Springs
[DE82-020632] N83-12541
Geothermal power development in Hawaii. Volume 1. Review and analysis
[DE82-020077] N83-12544

GEOTHERMAL RESOURCES
Geothermal power development in Hawaii. Volume 1. Review and analysis
[DE82-020077] N83-12544
Low- to moderate-temperature geothermal resource assessment for Nevada: Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] N83-12584
Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] N83-12706

GERMANIUM
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

GERMINATION
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482

GLASS
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
A bakable glass Pirani gauge for monitoring low vacuum
[PB82-190307] N83-12405

GLASS FIBER REINFORCED PLASTICS
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179

GLIDE PATHS
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057

GLOBAL AIR POLLUTION
The WMO background air pollution monitoring network (BAPMON) N83-12604
On the scales of different air pollution processes --- from the local to the global N83-12608
Integrated global monitoring of the environment: Practical considerations N83-12617
Aircraft and remote measurements of atmospheric transport of pollutants within the global integrated monitoring system N83-12620
Some principles of the interaction of a global monitoring system with national and regional natural environment pollution observation and information systems N83-12622

GLOBAL ATMOSPHERIC RESEARCH PROGRAM
Report of the Monex review meeting
[GARP-SPEC-REPT-38] N83-12707
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979
[GARP-FOR-1] N83-12794
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report
[GARP-FOR-8] N83-12796
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798
Manual on the global observing system. Volume 1 (annex to the WMO technical regulations): Global aspects, 1981 edition
[WMO-544-VOL-1-ANNEX] N83-12801
Report of the second session of the Intergovernmental Planning Meeting on Alpex --- Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981
[WMO-586] N83-12805
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3 summary of data collected 27 Nov. 1978 - 6 Mar. 1979
[GARP-FOR-3] N83-12806
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979
[GARP-FOR-4] N83-12807
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808

GLOBAL POSITIONING SYSTEM
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300

GOODNESS OF FIT
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868

GRAINS (FOOD)
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee
[E83-10006] N83-12486

GRAPH THEORY
An algorithm for reducing acyclic hypergraphs
[AD-A118535] N83-12936

GRAPHITE
Effect of HERF on sintering kinetics of ferrographite composites N83-12231

GRAPHITE-EPOXY COMPOSITES
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071
Opportunities for composites in commercial transport structures N83-12148
A model of the thermal-spike mechanism in graphite/epoxy laminates
[NASA-TM-84299] N83-12173
Failure characteristics of graphite-epoxy structural components loaded in compression
[NASA-TM-84552] N83-12174

GRAPHITE-POLYIMIDE COMPOSITES
PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175
Design, fabrication and test of graphite/polyimide composite joints and attachments --- spacecraft control surfaces
[NASA-CR-165955] N83-12450

GRAPHS (CHARTS)
Smoothing of scatterplots
[ORION-003] N83-12958

GRAVITATIONAL FIELDS
The report of the Gravity Field Workshop
[NASA-TM-84003] N83-12693

GRAVITY WAVES
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth
[AD-A118597] N83-12942

GRAVSAT SATELLITE
The report of the Gravity Field Workshop
[NASA-TM-84003] N83-12693

GRIDS
Long-pulse ion source for neutral-beam applications
[DE82-003521] N83-12984

GROUND EFFECT
Rotor aerodynamics in ground effect at low advance ratios
[AD-A118609] N83-12051
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458

GROUND STATE
Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011

GROUND STATIONS
The WMO background air pollution monitoring network (BAPMON) N83-12604
Data management and computation. Volume 1: Issues and recommendations
[PB82-188113] N83-13035

GROUND TRUTH
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504

GROUND WATER
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-186301] N83-12519
Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] N83-12706
GROUND WIND
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751
GROWTH
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182
GUIDANCE (MOTION)
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098
GULF OF MEXICO
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico
[FAA-RD-82-7] N83-12059
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
GUNS (ORDNANCE)
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462
GUSTS
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097
GYROSCOPES
Flexible satellite orientation, using the modal-analysis method for gyroscopic systems
[INPE-2505-PRE/186] N83-12127

H

H ALPHA LINE
Annotated atlas of H-alpha synoptic charts
[AD-A118170] N83-13053
H-1 ENGINE
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140
HABITATS
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674
HALF SPACES
Surface instabilities on an equibiaxially stretched elastic half-space
[TR-7] N83-12447
HALLEY'S COMET
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110
HAMILTON-JACOBI EQUATION
Some properties of viscosity solutions of Hamilton-Jacobi equations
[AD-A118607] N83-12938
HAMILTONIAN FUNCTIONS
Some properties of viscosity solutions of Hamilton-Jacobi equations
[AD-A118607] N83-12938
HARMONIC ANALYSIS
Harmonic analysis of normal pentad rainfall of Indian Stations
[PB82-186875] N83-12824
HARMONIC FUNCTIONS
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452
HARMONIC GENERATIONS
Technique development for weather forecasting
[AD-A118744] N83-12781
HARMONICS
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685
HAZARDS
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057
Earth-covered buildings: An exploratory analysis for hazard and energy performance
[PB82-189564] N83-12285
HEAD-UP DISPLAYS
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100
HEALTH
The significance of African climate in human health N83-12761
HEARING
Changes in the organ of hearing produced by sound
[AD-A118003] N83-12850
HEAT FLUX
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Measurement of metal temperature heat flux and strain N83-12264
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
HEAT MEASUREMENT
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
HEAT PIPES
Data collection and analysis for geothermal research
[PB82-185430] N83-12390
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525
HEAT RESISTANT ALLOYS
Solidification process control for advanced superalloys N83-12155
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215
Powder metallurgy of superalloys N83-12228
Orientation dependence of the stress rupture properties of Nickel-base superalloy single crystals
[NASA-CR-165394] N83-13009
HEAT SHIELDING
Thermal control system
[NASA-CASE-GSC-12771-1] N83-12361
HEAT SINKS
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525
HEAT TRANSFER
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement techniques for heat transfer in the turbine using short duration wind tunnel techniques N83-12271
Thermal control system
[NASA-CASE-GSC-12771-1] N83-12361
Numerical computation of multi-phase fluid flow and heat transfer N83-12367
Developments in the procedure for numerical computation of multi-phase-flow phenomena with inter-phase slip, unequal temperatures, et cetera N83-12370
The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371
Measurement of the combined heat and water-vapour flow through clothing under transient conditions
[AD-A118804] N83-12382
Applications of Rayleigh scattering to turbulent flows with heat transfer and combustion
[AD-A118576] N83-12385
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
Heat source: Materials interactions during fusion welding
[AD-A118776] N83-12436
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659
HEAT TRANSMISSION
Measurement of metal temperature heat flux and strain N83-12264
HEAT TREATMENT
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
HEATING
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] N83-12997
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007
HEAVY LIFT AIRSHIPS
Hybrid LTA vehicle controllability as affected by buoyancy ratio
[NASA-CR-152344] N83-12099
HELICOPTER ENGINES
Rotorcraft convertible engines for the 1980s
[NASA-TM-83003] N83-12091
HELICOPTERS
Rotor aerodynamics in ground effect at low advance ratios
[AD-A118609] N83-12051
Slack wire strike protection concepts
[AD-A118827] N83-12056
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
Application of the microwave landing system to helicopter operations
[FAA-RD-82-40] N83-12068
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071
Airworthiness and flight characteristics test. Part 1: YAH-64 advanced attack helicopter
[AD-A118490] N83-12075
Durability of aircraft composite materials N83-12164
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972
HERBICIDES
A study of volatility, content dynamics and transformation of priority pollutants in atmospheric and aquatic environments --- herbicides N83-12643
HEURISTIC METHODS
Detection of faulty inspection
[AD-A118549] N83-12441
HIGH ALTITUDE BALLOONS
Data transmitters and command receiver development
[AD-A118739] N83-12322
Electrical fields at stratospheric balloon altitudes
[INPE-2556-TDL/103] N83-12690
HIGH ENERGY INTERACTIONS
Injection of a high current beam into a modified betatron accelerator
[AD-A118581] N83-12980
HIGH FREQUENCIES
Initial results from HF propagation studies during solid shield
[AD-A118492] N83-12309
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007
HIGH PRESSURE
Neasurement of high-temperature high-pressure processes: A summary report
[PB82-196932] N83-12667
HIGH RESOLUTION
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308
HIGH STRENGTH STEELS
A single specimen J-based fracture toughness test for high strength steels
[AD-A118674] N83-12218
HIGH TEMPERATURE
Turbine engine materials durability research N83-12163
High temperature catalytically assisted combustion
[AD-A118641] N83-12188
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342
Neasurement of high-temperature high-pressure processes: A summary report
[PB82-196932] N83-12667
HIGH TEMPERATURE ENVIRONMENTS
A bakable glass Pirani gauge for monitoring low vacuum
[PB82-190307] N83-12405

HIGH TEMPERATURE GASES
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] N83-12437
HIGHWAYS
Status of alcohol-fuels-utilization technology for highway transportation: A 1981 perspective. Volume 1. Spark-ignition engines
[DE82-020493] N83-12255
Evaluation of Chem-Crete
[PB82-187808] N83-12284
HMX
Deflagration-to-detonation in HMX-based propellants
[AD-A118616] N83-12251
HOLDERS
Method and apparatus for gripping uniaxial fibrous composite materials --- holding specimens for mechanical property testing
[NASA-CASE-LEW-13758-1] N83-12176
HOLOGRAPHY
Flow visualiztion in a cryogenic wind tunnel using holography
[NASA-TM-84556] N83-12395
HOMOGENEITY
Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448
HORIZONTAL ORIENTATION
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] N83-12522
Horizontal and vertical axis wind turbines N83-12529
Aerodynamic analysis of horizontal axis wind turbines N83-12530
Control systems for horizontal-axis wind turbines N83-12532
Static and dynamic analysis for hinged rotor blades or 60 m span for a two bladed horizontal axis wind energy converter N83-12535
HOSPITALS
Evaluation of the medical information system at the the NIH Clinical Center
[PB82-190083] N83-13029
Evaluation of the medical information system at the NIH Clinical Center. Volume 2: Appendices on detailed functional performance and conduct of research
[PB82-190091] N83-13030
Evaluation of the medical information system at the NIH Clinical Center. Volume 3: Appendix on technical performance
[PB82-190109] N83-13031
Evaluation of the medical information system at the NIH Clinical Center. Volume 4: Appendix on cost-benefit analysis
[PB82-190117] N83-13032
Evaluation of the medical information system at the NIH Clinical Center. Volume 5: Appendices on surveys
[PB82-190125] N83-13033
Evaluation of the medical information system at the NIH Clinical Center. Volume 6: Appendices on data collection
[PB82-190133] N83-13034
HOT-WIRE ANEMOMETERS
Design and experimental study of low noise hot-wire anemometer with constant current mode
[NAL-TR-697] N83-12391
HOT-WIRE FLOWMETERS
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
HOUSINGS
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-169474] N83-12214
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971
HUMAN PERFORMANCE
The physical working environment and its effect on productivity in offices
[PB82-186461] N83-12862
HUMAN RESOURCES
Manpower resources in Africa: Training requirements and opportunities --- meteorological services N83-12765
HUMIDITY
Automated balance for determining true mass
[DE82-021737] N83-12402
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke
[PB82-188813] N83-12715
HYBRID CIRCUITS
High performance crystal oscillator development
[AD-A118764] N83-12339
HYBRID STRUCTURES
Research in adaptive control: Hybrid and constrained structure systems
[AD-A118534] N83-12918
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007
HYDRAULIC EQUIPMENT
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12289
Modular small hydro configuration
[PB82-184953] N83-12327
HYDROCARBONS
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189
Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] N83-12252
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630
Iowa air quality report, 1980
[PB82-189614] N83-12675
HYDROCHLORIC ACID
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
HYDROELECTRIC POWER STATIONS
Modular small hydro configuration
[PB82-184953] N83-12327
Climatic aspects of planning impoundments and hydropower operations N83-12754
HYDROGEN
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
Photosynthetic water splitting
[PB82-200684] N83-12206
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215
Metallographic standards for estimating hydrogen content of Zircaloy-4 tubing (LWBR development program)
[PB82-022074] N83-12225
HYDROGEN EMBRITTLEMENT
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
HYDROGEN PEROXIDE
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189
HYDROLOGY
Addendum to guidelines for the education and training of personnel in meteorology and operational hydrology. Part 2: Education and training of personnel in operational hydrology
[WMO-258] N83-12481
Hydrological data transmission
[WMO-559] N83-12514
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519
Hydrological aspects of water quality monitoring under the conditions of anthropogenic impact N83-12654
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Climatic aspects of planning impoundments and hydropower operations N83-12754
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981
[WMO-586] N83-12805
Compendium of training facilities for meteorology and operational hydrology
[WMO-240-REV] N83-12810
Meteorological and hydrological aspects of siting and operation of nuclear power plants. Volume 2: Hydrological aspects
[WMO-550-VOL-2] N83-12989
HYDROLOGY MODELS
Concepts and techniques in hydrological network design
[WMO-580] N83-12515
Long-range water supply forecasting
[WMO-587] N83-12516
HYDROMETEOROLOGY
Long-range water supply forecasting
[WMO-587] N83-12516
Strategies for the amelioration of agricultural drought in Africa N83-12745
The importance of climate change on the water balance of Lake Malawi N83-12757
World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795
HYDROTHERMAL SYSTEMS
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520
HYPERTHERMIA
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846

I

IBM COMPUTERS
IBM 3033 OS/VS COBOL release 2.3
[PB82-192766] N83-12909
IBM 370 COMPUTER
National CSS, Incorporated, IBM 360/370 OS/VS COBOL release 2.3
[PB82-192964] N83-12874
ICE FORMATION
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710
IDENTIFYING
Identification and Informative Sample Size
[REPT-147] N83-12924
IGNITION SYSTEMS
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140
IMAGE PROCESSING
Compression/depression of images from meteorological satellites for transmission by telephone
[INPE-2373-NTE/183] N83-12294
SP mountain data analysis
[NASA-CR-169471] N83-12303
System calibration strategies for spaceborne synthetic aperture radar
[PB82-182502] N83-12326
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project
[E83-10024] N83-12507
Remote sensing in geology: Current trends and future prospects with satellite data
[INPE-2514-PRE/193] N83-12509
An interactive model for atmospheric correction in satellite images
[INPE-2500-PRE/182] N83-12681
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713
SITIM system: Preliminary software design
[INPE-2499-NTE/190] N83-12883
Development of an image segmentation algorithm called MITES
[AD-A118577] N83-12897
Interpolation methods for multispectral images
[INPE-2450-PRE/148] N83-12923
Digital image interpolators by window methods
[INPE-2498-PRE/181] N83-12929
Image understanding research
[AD-A118738] N83-12994
IMAGING TECHNIQUES
Image understanding research
[AD-A118738] N83-12994
IMPACT STRENGTH
Fatigue and fracture research in composite materials N83-12152
IMPACT TESTS
Space nuclear safety and fuels program
[DE82-004687] N83-12968
IMPEDANCE
Reactanceless bandpass amplifier
[NASA-CASE-GSC-12788-1] N83-12333

IMPELLERS
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270
IMPLANTATION
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010
IMPLOSIONS
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
IMPURITIES
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004
INCIDENT RADIATION
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306
INCONEL (TRADEMARK)
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
INDEPENDENT VARIABLES
The Solution of Initial Value Problems Using Interval Arithmetic. Formulation and Analysis of an Algorithm
[REPT-144] N83-12926
Edgeworth expansions for linear combinations of order statistics
[MATH-CENTRE-TRACT-105] N83-12927
The selection of smoothness priors for distributed lag estimation
[AD-A118598] N83-12940
Screening designs for response surface experiments
[DE82-020486] N83-12948
INDEXES (DOCUMENTATION)
AgRISTARS documents tracking list report
[E83-10019] N83-12502
Compendium of training facilities for meteorology and operational hydrology
[WMO-240-REV] N83-12810
INDIAN SPACE PROGRAM
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
State of space science and technology --- Indian space program N83-12114
Applications of space science and technology --- Indian space program N83-12115
An appraisal of the programme --- Indian space program N83-12116
Looking ahead N83-12117
International co-operation and the role of the United Nations N83-12119
INDIAN SPACECRAFT
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
State of space science and technology --- Indian space program N83-12114
Applications of space science and technology --- Indian space program N83-12115
Looking ahead N83-12117
INDUSTRIAL ENERGY
Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] N83-12590
Industrial energy use, volume 2
[PB82-200593] N83-12593
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
INDUSTRIAL MANAGEMENT
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
INDUSTRIAL SAFETY
Effects of metric change on safety in the workplace for selected occupations
[AD-A118595] N83-12279
INDUSTRIES
Solar thermal industry status and future needs
[DE82-020885] N83-12546
INELASTIC SCATTERING
Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982
INELASTIC STRESS
An evaluation of the inelastic behaviour of two degree of freedom structures under earthquake loading
[TR-9] N83-12258
Materials constitutive models for nonlinear analysis of thermally cycled structures
[NASA-TP-2055] N83-12449
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
INERTIAL CONFINEMENT FUSION
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
INERTIAL NAVIGATION
Omega data bank report (Spring through Fall, 1980)
[DOT/FAA-CT-82-5] N83-12062
INFORMATION DISSEMINATION
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
INFORMATION MANAGEMENT
Application of climate data and information in the management of water resources --- in Africa N83-12755
Data integration: Combining real-world and simulation data
[AD-A118245] N83-13025
Managing Federal information resources: Report under the Paperwork Reduction Act of 1980
[PB82-194473] N83-13037
INFORMATION SYSTEMS
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements
[NASA-CR-2984] N83-12073
Modernization of the WWMCCS Information System (WIS). Executive summary and main report
[AD-A118784] N83-12314
World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
Evaluation of the medical information system at the the NIH Clinical Center
[PB82-190083] N83-13029
Evaluation of the medical information system at the NIH Clinical Center. Volume 2: Appendices on detailed functional performance and conduct of research
[PB82-190091] N83-13030
Evaluation of the medical information system at the NIH Clinical Center. Volume 3: Appendix on technical performance
[PB82-190109] N83-13031
Evaluation of the medical information system at the NIH Clinical Center. Volume 4: Appendix on cost-benefit analysis
[PB82-190117] N83-13032
Evaluation of the medical information system at the NIH Clinical Center. Volume 5: Appendices on surveys
[PB82-190125] N83-13033
Evaluation of the medical information system at the NIH Clinical Center. Volume 6: Appendices on data collection
[PB82-190133] N83-13034
INFORMATION THEORY
The Akaike information criterion and its application to mixture proportion estimation N83-12498
INFRARED IMAGERY
Estimating cloud parameters for Neros I
[PB82-186552] N83-12814
INFRARED PHOTOGRAPHY
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements
[AD-A118751] N83-12779
INFRARED RADIATION
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite
[INPE-2549-RPE/422] N83-12692
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821
INFRARED SPECTRA
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186
INFRARED SPECTROSCOPY
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations
[AD-A118707] N83-12195
INGOTS
Advanced powder metallurgy aluminum alloys and composites N83-12156
INHOMOGENEITY
On some pecularities of diffusion models in inhomogeneneous media N83-12653
INJECTORS
An experimental and analytical study on spray flow field by liquid/gas coaxial injector elements (I)
[NAL-TR-892] N83-12346
INLET FLOW
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044
INLETS (TOPOGRAPHY)
Sources, composition and transport of suspended particulate matter in Lower Cook Inlet and Northwestern Shelikof Strait, Alaska
[PB82-193236] N83-12837
INSOLATION
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
Data report for the Northeast Residential Experiment Station, Apr. 1982
[DE82-021954] N83-12569
Methodologies for assessing solar energy potential --- in Africa N83-12758
INSTRUCTORS
Pilot judgment training and evaluation, volume 3
[AD-A117508] N83-12855
INSTRUMENT APPROACH
The 30 LORAN-C navigator documentation
[DOT/FAA-RD-82-16] N83-12065
Application of the microwave landing system to helicopter operations
[FAA-RD-82-40] N83-12068
INSTRUMENT ERRORS
Methods of correction for systematic error in point precipitation measurement for operational use
[WMO-589] N83-12809
INSTRUMENTS
Instrumentation for LDA signal processing N83-12421
INTAKE SYSTEMS
Calculation of compressible flow in and about three-dimensional inlets with and without auxiliary inlets by a higher-order panel method
[NASA-CR-168009] N83-12047
INTEGRAL EQUATIONS
Turbulence modelling and boundary layer calculation methods N83-12364
Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925
INTEGRATED CIRCUITS
VLSI array processor
[AD-A118550] N83-12340
INTEGRATED OPTICS
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992
INTERFACES
An interactive review system for NASTRAN N83-12456
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
National software works development
[AD-A118494] N83-12886
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916
INTERFEROMETERS
A dual differential interferometer
[NASA-CASE-LAR-12966-I] N83-12969
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992
INTERMOLECULAR FORCES
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118698] N83-12425

INTERNAL COMBUSTION ENGINES
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
INTERNATIONAL COOPERATION
International issues N83-12118
International co-operation and the role of the United Nations N83-12119
Marine environmental monitoring requirements: Integrated global monitoring N83-12613
Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE --- first GARP Global Experiment (FGGE) N83-12735
World Weather Watch. Overall report on the Voluntary Cooperation Program, notably on projects approved for transmission to members of the WMO in 1980
[OMM-571] N83-12799
Report of the second session of the Intergovernmental Planning Meeting on Alpex --- Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804
INTERNATIONAL SYSTEM OF UNITS
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions
[AD-A118634] N83-12276
The consequences of metric conversion for small manufacturers. Volume 1: Summary report
[AD-A118633] N83-12277
Metric use in the tool industry. A status report and a test of assessment methodology
[AD-A118632] N83-12278
Effects of metric change on safety in the workplace for selected occupations
[AD-A118595] N83-12279
Research overview and analysis
[AD-A118594] N83-12280
Metric usage study: A look at 6 case histories
[AD-A118601] N83-12312
INTERPLANETARY FLIGHT
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110
INTERPOLATION
On the spatial interpolation of air pollution fields N83-12621
Interpolation methods for multispectral images
[INPE-2450-PRE/148] N83-12923
INTERPROCESSOR COMMUNICATION
Traditional computing center as a modern network node
[DE82-006935] N83-12914
INTERSTITIALS
Method of and apparatus for generating an interstitial point in a data stream having an even number of data points
[NASA-CASE-MFS-25319-1] N83-12932
INTERTROPICAL CONVERGENT ZONES
Climatological study of the intertropical convergence zone and its influence over the northeast of Brazil
[INPE-2534-TDL/101] N83-12720
A/B and B scale motion and balances in the ITCZ area --- GARP Atlantic Tropical Experiment (GATE) N83-12732
INVERSIONS
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite
[INPE-2549-RPE/422] N83-12692
INVISCID FLOW
Three dimensional flow computations in a turbine scroll
[NASA-CR-168003] N83-12045
Numerical simulation of inviscid compressible flow through two-dimensional cascade by finite area method
[NAL-TR-709] N83-12348
The computation of transonic potential flow N83-12379
ION ACCELERATORS
Intense relativistic electron beam investigations
[AD-A118664] N83-12978
ION BEAMS
Industrial ion source technology
[NASA-CR-159877] N83-12259
ION DENSITY (CONCENTRATION)
Development of an ion mass spectrometer and sounding rocket system for D-region cluster-ion measurements
[AD-A118752] N83-12191
ION ENGINES
Simplification of power electronics for ion thruster neutralizers
[NASA-TM-83004] N83-12141
Parallel plate radiofrequency ion thruster
[NASA-TM-83014] N83-12142
ION IMPLANTATION
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon
[PB82-183575] N83-13022
ION SOURCES
Industrial ion source technology
[NASA-CR-159877] N83-12259
Long-pulse ion source for neutral-beam applications
[DE82-003521] N83-12984
IONIC COLLISIONS
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983
IONIZATION
On particle ionization rates in the lower ionosphere over the South Atlantic magnetic anomaly
[INPE-2497-PRE/180] N83-12679
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case
[DE82-020362] N83-12947
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001
IONIZERS
Long-pulse ion source for neutral-beam applications
[DE82-003521] N83-12984
IONOGRAMS
Comparison of ionospheric electron density profiles obtained with the International Reference Ionosphere (IRI) 79 model and observed at Cachoeira Paulista
[INPE-2540-PRE/202] N83-12688
IONOSPHERE
On particle ionization rates in the lower ionosphere over the South Atlantic magnetic anomaly
[INPE-2497-PRE/180] N83-12679
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695
The statistical relations among Q, Kp, and the Global Weather Central -K indices
[AD-A118734] N83-12700
IONOSPHERIC DISTURBANCES
Initial results from HF propagation studies during solid shield
[AD-A118492] N83-12309
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321
IONOSPHERIC DRIFT
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695
IONOSPHERIC ELECTRON DENSITY
Comparison of ionospheric electron density profiles obtained with the International Reference Ionosphere (IRI) 79 model and observed at Cachoeira Paulista
[INPE-2540-PRE/202] N83-12688
IONOSPHERIC PROPAGATION
Initial results from HF propagation studies during solid shield
[AD-A118492] N83-12309
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321
IONS
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696
IRON
Effect of HERF on sintering kinetics of ferrographite composites N83-12231
IRON ALLOYS
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-169474] N83-12214
IRRIGATION
Darrieus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] N83-12564
ISLANDS
Climatic effects on soil erosion in Zanzibar --- rainfall effects N83-12752
ISOTONICITY
On isotonic selection rules for binomial populations better than a standard
[AD-A118548] N83-12961
ISOTOPES
GAMIDEN: A program to aid in the identification of unknown materials by gamma-ray spectroscopy
[DE82-021960] N83-12203
ISOTOPIC LABELING
Chemical and isotope analysis of trace pollutants in different environmental media N83-12612
ISOTROPIC TURBULENCE
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] N83-12996
ITERATION
Preliminary evaluation of the basic experimental active Beacon Collision Avoidance System (BCAS)
[DOT/FAA-RD-82-67] N83-12058
ITERATIVE SOLUTION
Computing a trust region step
[DE82-005656] N83-12905

J

JAMMING
Research on adaptive antenna techniques, 4
[AD-A118802] N83-12315
JET AIRCRAFT NOISE
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968
JET ENGINE FUELS
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] N83-12252
JET ENGINES
Research and development of lift-jet engine, 1 --- v/stol aircraft
[NAL-TR-699] N83-12084
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085
JET FLOW
The spreading rate of nonhomogeneous turbulent jets
[NAL-TR-701] N83-12347
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968
JET MIXING FLOW
The spreading rate of nonhomogeneous turbulent jets
[NAL-TR-701] N83-12347
JET STREAMS (METEOROLOGY)
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
JOINTS (JUNCTIONS)
Fatigue and fracture research in composite materials N83-12152
Design, fabrication and test of graphite/polyimide composite joints and attachments --- spacecraft control surfaces
[NASA-CR-165955] N83-12450
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
JUDGMENTS
Pilot judgment training and evaluation, volume 1
[AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3
[AD-A117508] N83-12855

K

KALMAN FILTERS
Oceanographic applications of the Kalman filter
[NASA-TM-83993] N83-12829
KANSAS
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
KENYA
Strategies for the amelioration of agricultural drought in Africa N83-12745
KEROSENE
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
KEVLAR (TRADEMARK)
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071
KINEMATICS
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
KINETIC ENERGY
Efficiency improved turboprop
[AD-A118819] N83-12096

Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571
KITS
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971

L

LABORATORIES
International research laboratory on the Moon: A proposal for a national commitment
[DE82-010043] N83-12112
LAKES
Hydrochemical observations at Lake Baikal. Present conditions --- pollution monitoring N83-12616
The importance of climate change on the water balance of Lake Malawi N83-12757
LAMINAR FLOW
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
LAMINATES
Fatigue and fracture research in composite materials N83-12152
Fatigue and fracture research in metals N83-12158
Failure characteristics of graphite-epoxy structural components loaded in compression
[NASA-TM-84552] N83-12174
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471
LAND USE
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project
[E83-10024] N83-12507
LANDFORMS
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
LANDING AIDS
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
LANDSLIDES
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
LAP JOINTS
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
LASER ANEMOMETERS
Introduction to laser anemometry studies in turbomachinery N83-12268
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270
Optical systems in laser anemometry N83-12409
Adaptation of laser velocimeters to various applications N83-12410
High velocity measurements: Special requirements N83-12411
Lay-out of optical systems for laser Doppler anemometers N83-12412
LASER ANNEALING
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
LASER APPLICATIONS
Ranging system --- industrial robotics
[NASA-CASE-NPO-15865-1] N83-12991
LASER DAMAGE
Role of laser-induced primary-defect formation in optical breakdown in NaCl
[DE82-002062] N83-13020
LASER DOPPLER VELOCIMETERS
Introduction to laser anemometry studies in turbomachinery N83-12268
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270
Laser Doppler measurements in transparent pump impellers N83-12272
Laser Velocimetry
[VKI-LS-1981-3] N83-12408
Optical systems in laser anemometry N83-12409
Adaptation of laser velocimeters to various applications N83-12410
High velocity measurements: Special requirements N83-12411
Lay-out of optical systems for laser Doppler anemometers N83-12412
Measurements in liquid flows: Refractive index matching N83-12413
Studies of particle motion by laser Doppler techniques N83-12414
Long range LDA wind velocity measurements using visible laser radiation N83-12415
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
Introduction to LDA signal analysis and signal processing N83-12418
Signal processing by counters and digital processing of LDA signals N83-12419
Measurements in gas flows and flames N83-12420
Instrumentation for LDA signal processing N83-12421
Particle behaviour in flows and suitable particles for LDA measurements N83-12422
Further developments in laser anemometry N83-12423
Measurements in particulate two phaseflows N83-12424
LASER INTERFEROMETRY
A nonintrusive laser interferometer method for measurement of skin friction
[NASA-TM-84300] N83-12393
LASER MATERIALS
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118898] N83-12425
Manufacturing methods and technology engineering for growth of large diameter Nd: YAG laser crystals
[AD-A118748] N83-13019
LASER OUTPUTS
Direct beam-quality measurement in pulsed aerodynamic windows
[DE82-019285] N83-12429
LASER TARGET INTERACTIONS
Role of laser-induced primary-defect formation in optical breakdown in NaCl
[DE82-002062] N83-13020
LASER TARGETS
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
LASERS
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
LATERAL CONTROL
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100
LATITUDE
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
Baroclinic analysis of the Southern Hemisphere
[INPE-2541-PRE/203] N83-12683
LAUNCH VEHICLES
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110
LAUNCH WINDOWS
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
LAUNCHERS
Rail accelerator research at Lewis Research Center
[NASA-TM-83015] N83-12143
LAUNCHING
Pointing payload for single tether balloons
[AD-A118770] N83-12054
LAUNCHING PADS
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
LAVA
SP mountain data analysis
[NASA-CR-169471] N83-12303
LAYERS
VLSI array processor
[AD-A118550] N83-12340
LEAD (METAL)
Estimation of pollution concentration at Cacapava, SP, using a three dimensional numerical model
[INPE-2529-RPE/417] N83-12597
Iowa air quality report, 1980
[PB82-189614] N83-12675
LEADING EDGES
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
LEAST SQUARES METHOD
A modified Newton method for multilateration and its application to the RMS/MTTS system
[AD-A118728] N83-12122
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
FITS: A function fitting program
[DE82-021259] N83-12907
LEAVES
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
A new method for study of injurious effect of dust pollution on leaves N83-12637
LEVITATION
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
LIBRARIES
Guidelines for using the AMDLIB, IMSL and NAG mathematical software libraries at ANL
[ANL-81-73] N83-12884
LIFE CYCLE COSTS
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589
LIFE SPAN
Lower bounds for the life span of solutions of nonlinear wave equations in three dimensions
[AD-A118599] N83-12839
LIFT FANS
Research and development of lift-jet engine, 1 --- v/stol aircraft
[NAL-TR-699] N83-12084
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085
A remote augmentor lift system with a turbine bypass engine
[NASA-TM-82932] N83-12087
LIFTING ROTORS
Research and development of lift-jet engine, 1 --- v/stol aircraft
[NAL-TR-699] N83-12084
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085
LIGHTNING
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 6: Cloud-to-ground lightning data for FACE-2
[PB82-183187] N83-12817
LINE OF SIGHT
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308
LINE SPECTRA
Possibility of detecting the nuclear gamma line at 6.13 MeV of atmospheric and cosmic origin O(16) --- line spectra
[INPE-2511-PRE/190] N83-12684
High sensitivity molecular line observations of IRC+10216
[PB82-187220] N83-13044
LINEAR ARRAYS
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
LINEAR EQUATIONS
Study of problems of ill-conditioned regression in the presence of multicollinearity
[INPE-2401-PRE/115] N83-12921
Noise source mechanisms in unsteady flow
[PB82-203837] N83-12976
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
LINEAR SYSTEMS
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
Implementation and testing of a suboptimal procedure for attaining control in dynamic optimization problems
[INPE-20508-TDL/098] N83-12917

The selection of smoothness priors for distributed lag estimation
[AD-A118598] N83-12940

LIQUEFACTION
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208

LIQUEFIED NATURAL GAS
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] N83-12257
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659
The behavior of LNG vapor clouds: Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] N83-12665
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666

LIQUID FLOW
Measurements in liquid flows: Refractive index matching N83-12413

LIQUID FUELS
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

LIQUID HELIUM
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140

LIQUID INJECTION
An experimental and analytical study on spray flow field by liquid/gas coaxial injector elements (I)
[NAL-TR-692] N83-12346

LIQUID NITROGEN
Heat of mixing apparatus for liquefied gases
[PB82-195645] N83-12403

LIQUID OXYGEN
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140
Heat of mixing apparatus for liquefied gases
[PB82-195645] N83-12403

LIQUID-VAPOR EQUILIBRIUM
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208

LIQUIDS
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207

LITHIUM CHLORIDES
High efficiency lithium-thionyl chloride cell
[AD-A118696] N83-12537

LITHIUM SULFUR BATTERIES
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573

LIVESTOCK
The role of climatological information in the protection of plants and animals N83-12746
Prediction of range production from weather records in Africa --- livestock breeding N83-12748

LOAD TESTS
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133

LOADS (FORCES)
Improved methods for predicting spectrum loading effects. Volume 1: Technical summary
[AD-A118856] N83-12077
Improved methods for predicting spectrum loading effects. Volume 2: Test data
[AD-A118857] N83-12078
Strain gage load measurement on the shuttle orbiter
[NASA-TM-84898] N83-12135
Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12888

LONG RANGE WEATHER FORECASTING
The B-G system of evaluating forecasts
[AD-A118735] N83-12782

LONG TERM EFFECTS
Measurement of metal temperature heat flux and strain N83-12264
Numerical simulation of air pollutant spreading processes by transport equation N83-12629
Persistence in model ecosystems
[PB82-196916] N83-12669
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753

LOOP ANTENNAS
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321

LORAN C
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico
[FAA-RD-82-7] N83-12059
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
The 30 LORAN-C navigator documentation
[DOT/FAA-RD-82-16] N83-12065
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299

LOSSES
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] N83-13003

LOW ALTITUDE
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858

LOW FREQUENCIES
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321

LOW GRAVITY MANUFACTURING
Materials processing in space N83-12166

LOW PASS FILTERS
An active filter capable of realizing any stable transfer function
[INPE-2554-RPE/418] N83-12331

LOW SPEED
Stewartson's triple deck
[AD-A118617] N83-12381

LOW SPEED STABILITY
Hybrid LTA vehicle controllability as affected by buoyancy ratio
[NASA-CR-152344] N83-12099

LOW TEMPERATURE
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470

LOW TEMPERATURE ENVIRONMENTS
The effect of the thermal conditions of training and testing on the performance of motor tasks measuring primary manual abilities
[AD-A118275] N83-12859

LOW VACUUM
A bakable glass Pirani gauge for monitoring low vacuum
[PB82-190307] N83-12405

LOWER ATMOSPHERE
Eddy diffusion coefficients in the lower thermosphere --- turbulent diffusion
[INPE-2502-PRE/183] N83-12680

LUBRICANT TESTS
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N83-12241

LUBRICATING OILS
Colorimetric oil analysis for titanium
[AD-A118445] N83-12190
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N83-12241
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433

LUBRICATION
Tribology N83-12167
Elastohydrodynamic lubrication theory
[NASA-TM-81695] N83-12432

LUMINANCE
Interpolation methods for multispectral images
[INPE-2450-PRE/148] N83-12923

LUMINOUS INTENSITY
Photosynthetic water splitting
[PB82-200684] N83-12206

LUNAR LANDING
Man in space
[PB82-186784] N83-13023

LUNAR SOIL
Extraterrestrial materials processing and construction --- space industrialization
[NASA-CR-167756] N83-12109

LUNAR TIDES
Perturbation of artificial satellites due to tides
[INPE-2388-PRE/108] N83-12124
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685

M

MACH NUMBER
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043

MACHINE TOOLS
Metric use in the tool industry. A status report and a test of assessment methodology
[AD-A118632] N83-12278
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281

MAGMA
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224

MAGNESIUM ALLOYS
Some studies on the aluminium alloy formation during sintering of metal powders N83-12230
Testing of the permanent magnet material Mn-Al-C for potential use in propulsion motors for electric vehicles
[NASA-CR-169481] N83-12329

MAGNETIC ANOMALIES
On particle ionization rates in the lower ionosphere over the South Atlantic magnetic anomaly
[INPE-2497-PRE/180] N83-12679

MAGNETIC COILS
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332

MAGNETIC COMPRESSION
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] N83-12998

MAGNETIC CORES
Development of soft magnetic alloys with special properties
[PB82-207358] N83-12235

MAGNETIC DISKS
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306

MAGNETIC FIELD CONFIGURATIONS
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002

MAGNETIC FIELDS
Parallel plate radiofrequency ion thruster
[NASA-TM-83014] N83-12142
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] N83-12998
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] N83-13003

MAGNETIC MATERIALS
Development of soft magnetic alloys with special properties
[PB82-207358] N83-12235

MAGNETIC MIRRORS
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] N83-13003

MAGNETIC PROPERTIES
Development of soft magnetic alloys with special properties
[PB82-207358] N83-12235
Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017

MAGNETIC STORMS
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055

MAGNETIC SURVEYS
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513
A multi-site magnetotelluric measurement system with real-time data analysis
[DE82-020596] N83-12704

MAGNETOHYDRODYNAMIC FLOW
Aerophysical aspects of gas and plasma flows
[AD-A118588] N83-12364

MAGNETOHYDRODYNAMIC GENERATORS
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] N83-13005

MAGNETOHYDRODYNAMIC STABILITY
Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] N83-12995

MAGNETOHYDRODYNAMICS
Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] N83-12998

MAGNETOMETERS
The DE magnetometer preprocessor users guide
[NASA-TM-83999] N83-12882

MAGNETRONS
Construction, test and delivery of sta.ndardized coaxial magnetron
[AD-A118475] N83-12336

MAGNETS
The powder metallurgy of rare earth-cobalt permanent magnets N83-12234

MAINTENANCE
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187931] N83-12108
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
On-Line Pattern Analysis and Recognition System, OLPARS 6. Programmer and system maintenance manual
[AD-A118731] N83-12899

MALAWI
The importance of climate change on the water balance of Lake Malawi N83-12757

MALFUNCTIONS
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Beverly High School, Beverly, Massachusetts
[DE82-006236] N83-12543

MAN ENVIRONMENT INTERACTIONS
The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753
Assessing the impact of climate on society: A research review N83-12764
Geophysical monitoring for climatic change no. 9
[PB82-193061] N83-12813

MAN MACHINE SYSTEMS
Operation plan for the data 100/LARS terminal system
[E83-10011] N83-12490

MANAGEMENT METHODS
The dredging dilemma: System problems and management solutions
[PB82-184979] N83-12288

MANAGEMENT PLANNING
Systems engineering: A project planning and control methodology
[INPE-2496-PRE/179] N83-12965

MANPOWER
Manpower resources in Africa: Training requirements and opportunities --- meteorological services N83-12765

MANUALS
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual
[PB82-178989] N83-12345

MANUFACTURING
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions
[AD-A118634] N83-12276
The consequences of metric conversion for small manufacturers. Volume 1: Summary report
[AD-A118633] N83-12277
Manufacturing methods and techniques for miniature high voltage hybrid multiplier modules
[AD-A118783] N83-12337
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861

MAPPING
Charting utilization requirements for a digital cartographic data base
[AD-A118455] N83-12510
Scatterplate flux mapping for solar concentrators
[DE82-021359] N83-12588
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713

MAPS
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858
Software for three dimensional topographic sciences
[AD-A118465] N83-12898

MARINE BIOLOGY
Annotated bibliography of water optical properties of ocean waters
[AD-A116182] N83-12834
A guide to the principal marine fouling organisms, with particular reference to Cockburn Sound, Western Australia
[MRL-R-858] N83-12842

MARINE ENVIRONMENTS
Marine environmental monitoring requirements: Integrated global monitoring N83-12613
Progress in the study of contamination effects in the marine environment --- effects on marine organisms N83-12615
Use of river basin water quality monitoring data to analyze heavy metal input to the marine environment N83-12625
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835

MARINE METEOROLOGY
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
Large-scale mean state N83-12727
Synoptic-scale motions --- GARP Atlantic Tropical Experiment (GATE) N83-12728
Commission for Marine Technology: Abridged report of the 8th Session --- resolutions and recommendations for ocean exploration and exploitation
[WMO-584] N83-12803

MARKETING
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions
[AD-A118634] N83-12276

MARTENSITIC TRANSFORMATION
Shape-memory resistivity behavior of transformation-fatigue-cycled nickel-titanium wires near the equiatomic composition
[DE82-018272] N83-12226

MASS SPECTROMETERS
Development of an ion mass spectrometer and sounding rocket system for D-region cluster-ion measurements
[AD-A118752] N83-12191

MASS SPECTROSCOPY
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] N83-12202
Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] N83-12252

MASS TRANSFER
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256
Developments in the procedure for numerical computation of multi-phase-flow phenomena with inter-phase slip, unequal temperatures, et cetera N83-12370
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798

MATERIALS
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342

MATERIALS RECOVERY
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041

MATHEMATICAL MODELS
Elastohydrodynamic lubrication theory
[NASA-TM-81695] N83-12432
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
Second generation crop yield models review
[E83-10003] N83-12483
The possible modifications of the Hisse model for pure LANDSAT agricultural data N83-12497
Study of pollutant migration processes in the soil-plant, soil-water system --- modeling N83-12640
Review of atmospheric diffusion models for regulatory applications
[WMO-581] N83-12662
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
Theoretical studies of tropical waves --- GARP Atlantic Tropical Experiment (GATE) N83-12729
Large-scale numerical modelling --- GARP Atlantic Tropical Experiment (GATE) N83-12730
Numerical modeling of tropical weather systems
[AD-A118836] N83-12784
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821

MATHEMATICAL PROGRAMMING
Soviet mathematical programming
[AD-A116970] N83-12934
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935

MATRICES (MATHEMATICS)
Introduction to multi-grid methods for the numerical solution of boundary value problems N83-12374
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523
On a generalization of the matric-t distribution
[TR-71] N83-12955
On patterned matrices and their applications in multivariate statistics
[TR-67] N83-12957

MATRIX MATERIALS
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Polymer materials research at NASA Ames Research Center N83-12150
Polymer matrix composites research at NASA Lewis Research Center N83-12151
Research on ultra-high-temperature materials, monolithic ceramics, ceramic matrix composites and carbon/carbon composites N83-12161

MATTER (PHYSICS)
Isotopic-abundance ratios and Dirac's large-numbers hypothesis
[DE82-020194] N83-13043

MAXIMUM ENTROPY METHOD
Multichannel maximum entropy method of spectral analysis applied to offshore structures
[PB82-182676] N83-12476
The Akaike information criterion and its application to mixture proportion estimation N83-12498

MAXIMUM LIKELIHOOD ESTIMATES
Detection of faulty inspection
[AD-A118549] N83-12441
The selection of smoothness priors for distributed lag estimation
[AD-A118598] N83-12940

MEAN
A randomized solution for multi-Bayes estimates of the multinormal mean
[TR-69] N83-12952
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954
Three-Bayesian estimation of a multinormal mean: An example
[TR-72] N83-12956

MEASUREMENT
Problems of measurement of dynamic wall pressures N83-12263
Measurement of metal temperature heat flux and strain N83-12264
Vibration and clearance measurements on rotating blades using stationary probes N83-12265

MEASURING INSTRUMENTS
Strain gage load measurement on the shuttle orbiter [NASA-TM-84898] N83-12135
A survey of spectral response measurements for photovoltaic devices [DE82-006221] N83-12545
Instruments and methods for monitoring background soil pollution — in the U.S.S.R. N83-12650
MECHANICAL DEVICES
Method and apparatus for gripping uniaxial fibrous composite materials — holding specimens for mechanical property testing [NASA-CASE-LEW-13758-1] N83-12176
Diagnostic problems with technical systems [ISSN-0208-5658] N83-12964
MECHANICAL ENGINEERING
Diagnostic problems with technical systems [ISSN-0208-5658] N83-12964
MECHANICAL PROPERTIES
Experimental studies of the effect of scale on the stressing of metals [ISSN-0208-5658] N83-12211
Diffusional transformations, strengthening mechanisms, and mechanical properties of uranium alloys [DE82-020051] N83-12222
Measurement Techniques in Turbomachines [VKI-LS-1981-7] N83-12260
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction [AD-A118583] N83-12435
Heat source: Materials interactions during fusion welding [AD-A118776] N83-12436
Performance tests of full span form bridges [PB82-183039] N83-12475
MEDICAL SCIENCE
Evaluation of the medical information system at the the NIH Clinical Center [PB82-190083] N83-13029
Evaluation of the medical information system at the NIH Clinical Center. Volume 2: Appendices on detailed functional performance and conduct of research [PB82-190091] N83-13030
Evaluation of the medical information system at the NIH Clinical Center. Volume 3: Appendix on technical performance [PB82-190109] N83-13031
Evaluation of the medical information system at the NIH Clinical Center. Volume 4: Appendix on cost-benefit analysis [PB82-190117] N83-13032
Evaluation of the medical information system at the NIH Clinical Center. Volume 5: Appendices on surveys [PB82-190125] N83-13033
Evaluation of the medical information system at the NIH Clinical Center. Volume 6: Appendices on data collection [PB82-190133] N83-13034
MERCURY (METAL)
Simulation of the dropping mercury electrode by orthogonal collocation [AD-A118689] N83-12187
MERCURY CADMIUM TELLURIDES
HgCdTe fabrication using directed energy techniques [AD-A118654] N83-13013
MESOMETEOROLOGY
A climatological study of the AFGL mesonetwork, volume 1 [AD-A118766] N83-12768
MESOSCALE PHENOMENA
Technique development for weather forecasting [AD-A118744] N83-12781
Boundary-layer mesoscale wind analysis [DE82-020414] N83-12786
MESOSPHERE
Solar tide in the atmospheric sodium layer [INPE-2449-PRE/147] N83-13046
MESSAGE PROCESSING
JAMPS data table maintenance manual [AD-A118476] N83-12869
METAL BONDING
Advances in metals processing N83-12157
METAL FATIGUE
High-temperature fatigue in metals N83-12159
METAL MATRIX COMPOSITES
Carbide-binder phases in cemented carbides N83-12233
METAL POWDER
Powder Metallurgy Alloys: Proceedings of the Symposium [PB82-253931] N83-12227
Powder metallurgy of superalloys N83-12228
Production of titanium alloy powders N83-12229
Some studies on the aluminium alloy formation during sintering of metal powders N83-12230
METALLURGY
Heat source: Materials interactions during fusion welding [AD-A118776] N83-12436
METALS
Experimental studies of the effect of scale on the stressing of metals [ISSN-0208-5658] N83-12211
Metal phthalocyanine polymers [NASA-CASE-ARC-11405-1] N83-12239
Measurement of metal temperature heat flux and strain N83-12264
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system [DE82-020364] N83-12281
Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651
METEOROLOGICAL CHARTS
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Osan AB, Korea [AD-A118472] N83-12775
Basic synoptic networks of observing stations [WMO-217] N83-12800
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3, summary of data collected 27 Nov. 1978 - 6 Mar. 1979 [GARP-FOR-3] N83-12806
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979 [GARP-FOR-4] N83-12807
Pentad rainfall charts and space-time variations of rainfall over India and the adjoining areas [PB82-187279] N83-12825
METEOROLOGICAL FLIGHT
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979 [GARP-FOR-1] N83-12794
METEOROLOGICAL PARAMETERS
Monitoring of complementary parameters indispensable for interpretation and use of data on pollution in rainfall N83-12610
Monitoring of meteorological elements in a composite program for environmental pollution studies N83-12648
A study of meteorological time series. Part 2: Applications of autoregressive models [INPE-2519-PRE/194-PT-2] N83-12717
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph [GARP-PUB-SER-25] N83-12724
Large-scale mean state N83-12727
Large-scale numerical modelling — GARP Atlantic Tropical Experiment (GATE) N83-12730
Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE — first GARP Global Experiment (FGGE) N83-12735
Prediction of range production from weather records in Africa — livestock breeding N83-12748
Climatic aspects of planning impoundments and hydropower operations N83-12754
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York [AD-A118471] N83-12776
Weather and airborne organisms [WMO-562] N83-12793
Manual on the global observing system. Volume 1 (annex to the WMO technical regulations): Global aspects, 1981 edition [WMO-544-VOL-1-ANNEX] N83-12801
Focusing mechanisms in the Texas flash floods of 1978 [PB82-185380] N83-12822
Meteorology of important rainstorms in the Colorado River and Great Basin drainages [PB82-185414] N83-12823
METEOROLOGICAL RADAR
Radar analysis for severe weather detection and tracking [FAA-RD-82-64] N83-12719
GATE observational strategy: A look in retrospect N83-12726
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 3: S- and C-band radar observations in support of FACE-2 [PB82-183179] N83-12816
METEOROLOGICAL SATELLITES
Applications of space science and technology — Indian space program N83-12115
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements [AD-A118751] N83-12779
METEOROLOGICAL SERVICES
Addendum to guidelines for the education and training of personnel in meteorology and operational hydrology. Part 2: Education and training of personnel in operational hydrology [WMO-258] N83-12481
Hydrological data transmission [WMO-559] N83-12514
The climate of Africa, including feasibility study of climate alert system N83-12737
Manpower resources in Africa: Training requirements and opportunities — meteorological services N83-12765
World Weather Watch. Overall report on the Voluntary Cooperation Program, notably on projects approved for transmission to members of the WMO in 1980 [OMM-571] N83-12799
World Integrated Oceanic Services System: General plan and operational program for 1982-1985 [WMO-582] N83-12802
Regional Association 4 (North and Central America). Abridged report of the eighth session — conference, Havana, 23 Nov. - 2 Dec. 1981 [WMO-586] N83-12805
Activities of the WMO [WMO-592] N83-12811
METEOROLOGY
Air Weather Service (AWS) climatic briefs: North America [AD-A118448] N83-12766
Air Weather Service (AWS) climatic briefs: Latin America [AD-A118449] N83-12769
Compendium of training facilities for meteorology and operational hydrology [WMO-240-REV] N83-12810
METHANE
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system [PB82-200637] N83-12208
Assessment of research and development needs for methane fueled engine systems [PB82-199035] N83-12257
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics [DE82-021010] N83-12571
METHOD OF MOMENTS
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis [AD-A118459] N83-12318
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 2. Users manual [AD-A118497] N83-12324
METHODOLOGY
Manufacturing methods and techniques for miniature high voltage hybrid multiplier modules [AD-A118783] N83-12337
METHYL ALCOHOLS
Flame propagation analysis of water-alcohol mixtures [INPE-2548-PRE/205] N83-12180
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine [NASA-CR-167917] N83-12250
Status of alcohol-fuels-utilization technology for highway transportation: A 1981 perspective. Volume 1. Spark-ignition engines [DE82-020493] N83-12255
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental [DE82-006057] N83-12542
METHYLENE
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide [AD-A118782] N83-12189
METRICATION
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions [AD-A118634] N83-12276
METROLOGY
Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration [NASA-CR-169476] N83-12880
MICROCOMPUTERS
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design [AD-A118822] N83-12870
MICROELECTRONICS
Solid state research, 1982-1 [AD-A118847] N83-13015

MICROMETEOROLOGY
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
MICROPROCESSORS
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept
[AD-A118768] N83-12076
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890
MICROSTRUCTURE
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
Diffusional transformations, strengthening mechanisms, and mechanical properties of uranium alloys
[DE82-020051] N83-12222
Sonde experiments for comparative measurements of optical turbulence
[AD-A118740] N83-12699
MICROWAVE ANTENNAS
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
MICROWAVE COUPLING
High power microwave energy coupling to nitrogen during breakdown
[AD-A118520] N83-12999
MICROWAVE EMISSION
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4
[NASA-TM-84929] N83-13047
MICROWAVE LANDING SYSTEMS
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
Application of the microwave landing system to helicopter operations
[FAA-RD-82-40] N83-12068
MICROWAVE RADIOMETERS
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
MICROWAVE SENSORS
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491
MICROWAVES
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
MILITARY TECHNOLOGY
Conservation of strategic metals N83-12154
MILLIMETER WAVES
Design concepts for a high-impedance narrow-band 42 GHz power TWT using a fundamental/forward ladder-based circuit
[NASA-CR-165282] N83-12330
MINERAL DEPOSITS
Mineral resources: Genetic understanding for practical applications
[PB82-182114] N83-12517
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
MINERAL EXPLORATION
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512
Mineral resources: Genetic understanding for practical applications
[PB82-182114] N83-12517
MINERALS
Spectral properties of minerals and rocks and their applications in geology
[INPE-2515-NTE/192] N83-12691
MINES (EXCAVATIONS)
Rock mechanics investigation of two bed trona mining, Green River, Wyoming
[PB82-177312] N83-12709
MINIATURIZATION
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098
MINIMAX TECHNIQUE
Minimax linear estimtion and control
[AD-A106983] N83-12960
MINING
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542
MINUTEMAN ICBM
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
MISSILE RANGES
A modified Newton method for multilateration and its application to the RMS/MTTS system
[AD-A118726] N83-12122
MISSILES
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
MISSION PLANNING
Modified version of the TIROS N/NOAA A-G satellite series (NOAA E-J) advanced TIROS N (ATN)
[PB82-194044] N83-12131
Mission operation report: Space Shuttle program
[NASA-TM-84889] N83-12134
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895
The future of high energy gamma ray astronomy and its potential astrophysical implications
[NASA-TM-83986] N83-13042
MISSISSIPPI RIVER (US)
Preliminary investigations: Archaeology and sediment geomorphology, navigation pool 12, Upper Mississippi River. Volume 2. Technical documents and site data sheets
[AD-A116798] N83-12698
MODAL RESPONSE
Flexible satellite orientation, using the modal-analysis method for gyroscopic systems
[INPE-2505-PRE/186] N83-12127
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
MODELS
Advanced communication system studies
[AD-A118561] N83-12317
MODULATION
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
MODULUS OF ELASTICITY
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
MOISTURE
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071
On the determination of precipitation efficiency
[PB82-184938] N83-12820
MOISTURE CONTENT
A model of the thermal-spike mechanism in graphite/epoxy laminates
[NASA-TM-84299] N83-12173
Flame propagation analysis of water-alcohol mixtures
[INPE-2548-PRE/205] N83-12180
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488
Meteorology of important rainstorms in the Colorado River and Great Basin drainages
[PB82-185414] N83-12823
MOLDS
Processing composite materials N83-12153
MOLECULAR CHAINS
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182
MOLECULAR ORBITALS
Separated-channel static-exchange calculations of the photoionization of the 1 Pi(g) orbital of O2
[PB82-187261] N83-12985
Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011
MOLECULAR ROTATION
Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982
MOLECULAR SPECTRA
High sensitivity molecular line observations of IRC+10216
[PB82-187220] N83-13044
MOLECULAR SPECTROSCOPY
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118698] N83-12425
MOLECULES
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696
MOLLUSKS
Changes in the levels of DDE and polychlorinted biphenyl (PCB) contamination of California coastal waters, 1971 - 1977: Use of the mussel, Mytilus californianus, as an indicator species N83-12638
MOLYBDENUM ALLOYS
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224
MONATOMIC GASES
Aerophysical aspects of gas and plasma flows
[AD-A118588] N83-12384
MONKEYS
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
MONOPULSE RADAR
The AMPS computer system: Design and operation
[ATC-110] N83-12867
MONSOONS
Report of the Monex review meeting
[GARP-SPEC-REPT-38] N83-12707
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report
[GARP-FOR-8] N83-12796
MONTANA
Winter wheat stand density determination and yield estimates from handheld and airborne scanners --- Montana
[E83-10013] N83-12492
MOON
International research laboratory on the Moon: A proposal for a national commitment
[DE82-010043] N83-12112
MORPHOLOGY
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
MORTARS (MATERIAL)
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470
MOTION SICKNESS
A heuristic mathematical model for the dynamics of sensory conflict and motion sickness
[NASA-CR-169472] N83-12847
MOTOR VEHICLES
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] N83-12257
MOTORS
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332
MOUNTAINS
SP mountain data analysis
[NASA-CR-169471] N83-12303
On the determination of precipitation efficiency
[PB82-184938] N83-12820
MUD
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
MULTIPHASE FLOW
Characteristics of high performance ejectors
[AD-A118720] N83-12095
Numerical Computation of Multi-phase Flows
[VKI-LS-1981-2] N83-12365
Numerical Computation of Multi-phase Flows: A course of twelve lectures and computer workshops N83-12366
Numerical computation of multi-phase fluid flow and heat transfer N83-12367
Mathematical methods in nuclear-reactor thermal hydraulics N83-12369
Developments in the procedure for numerical computation of multi-phase-flow phenomena with inter-phase slip, unequal temperatures, et cetera N83-12370
MULTIPLIERS
Manufacturing methods and techniques for miniature high voltage hybrid multiplier modules
[AD-A118783] N83-12337
MULTIPROCESSING (COMPUTERS)
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868

MULTIPROGRAMMING
NASTRAN of the HEP N83-12465
MULTISPECTRAL BAND SCANNERS
Computational modeling of multispectral remote sensing systems: Background investigations [NASA-CR-165974] N83-12394
MULTISTAGE ROCKET VEHICLES
Three stage rocket vehicle with parallel staging --- space transportation system [NASA-CASE-MFS-25878-1] N83-12138
MULTIVARIATE STATISTICAL ANALYSIS
The Akaike information criterion and its application to mixture proportion estimation N83-12498
Identification and Informative Sample Size [REPT-147] N83-12924
A randomized solution for multi-Bayes estimates of the multinormal mean [TR-69] N83-12952
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations [TR-70] N83-12954
On a generalization of the matric-t distribution [TR-71] N83-12955
On patterned matrices and their applications in multivariate statistics [TR-67] N83-12957

N

NACELLES
An engine installation for fan jet STOL aircraft using USB powered high lift system (I) engine matching test for circular confluent exhaust duct [NAL-TR-703] N83-12086
NASA PROGRAMS
The NASA Geodynamics Program report, 1981 [NASA-TM-85126] N83-12702
The future of high energy gamma ray astronomy and its potential astrophysical implications [NASA-TM-83986] N83-13042
NASTRAN
Tenth NASTRAN User's Colloquium [NASA-CP-2249] N83-12452
Operating in the age of NASTRAN N83-12453
Recent improvements and enhancements to NASTRAN N83-12454
Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455
An interactive review system for NASTRAN N83-12456
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459
Large displacements and stability analysis of nonlinear propeller structures N83-12460
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462
A new capability for elastic aircraft airloads via NASTRAN N83-12464
NASTRAN of the HEP N83-12465
Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467
On restarts in NASTRAN N83-12469
A fast hidden line algorithm for plotting finite element models [NASA-TM-83981] N83-12879
NATIONAL PARKS
Man in space [PB82-186784] N83-13023
NAVIER-STOKES EQUATION
Turbulent solution of the Navier-Stokes equations for an inhomogenous developing shear layer [NASA-TM-82969] N83-12357
Convergence acceleration of viscous flow computations [NASA-TM-83039] N83-12930
NAVIGATION
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico [FAA-RD-82-7] N83-12059
Instrument approach aids for helicopters [FAA-RD-82-6] N83-12061
Thumb actuated two axis controller [NASA-CASE-ARC-11372-1] N83-12098
NAVIGATION SATELLITES
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica [PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica [PB82-187931] N83-12108
NAVSTAR SATELLITES
Instrument approach aids for helicopters [FAA-RD-82-6] N83-12061
NEGATIVE IONS
Laboratory studies of solvated gas-phase anions [AD-A118578] N83-12696
NEPHELOMETERS
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke [PB82-188813] N83-12715
NETWORK ANALYSIS
Next generation communications satellites: multiple access and network studies [NASA-CR-167903] N83-12129
Traditional computing center as a modern network node [DE82-006935] N83-12914
NETWORK SYNTHESIS
Concepts and techniques in hydrological network design [WMO-580] N83-12515
NEUROPHYSIOLOGY
A neurobehavioral study of rats using a model perfluorinated acid, NDFDA [AD-A118560] N83-12843
NEUTRAL BEAMS
Long-pulse ion source for neutral-beam applications [DE82-003521] N83-12984
Fusion Energy Division automation of the ISX-B neutral beams [DE82-016369] N83-13008
NEUTRAL PARTICLES
The neutral particle density field around a satellite [INPE-2504-PRE/185] N83-12126
NEUTRALIZERS
Simplification of power electronics for ion thruster neutralizers [NASA-TM-83004] N83-12141
NEW YORK
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982 [DE82-021301] N83-12586
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York [AD-A118471] N83-12776
NICKEL
Orientation dependence of the stress rupture properties of Nickel-base superalloy single crystals [NASA-CR-165394] N83-13009
NICKEL ALLOYS
Shape-memory resistivity behavior of transformation-fatigue-cycled nickel-titanium wires near the equiatomic composition [DE82-018272] N83-12226
Preparation of zirconium-nickel alloy by powder metallurgy N83-12232
Development of soft magnetic alloys with special properties [PB82-207358] N83-12235
NICKEL ZINC BATTERIES
Development of a high-rate insoluble zinc electrode for alkaline batteries [DE82-020608] N83-12572
Technology-base research project for electrochemical storage report for 1981 [DE82-020599] N83-12573
NICKEL-IRON BATTERIES
Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion [DE82-021216] N83-12582
Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981 [DE82-021143] N83-12583
NIGHT
Current practices on nighttime pavement construction asphaltic concrete [DOT/FAA-RD-80-121] N83-12101
NIOBIUM
Conservation of strategic metals N83-12154
NITROGEN
High power microwave energy coupling to nitrogen during breakdown [AD-A118520] N83-12999
NITROGEN DIOXIDE
Iowa air quality report, 1980 [PB82-189614] N83-12675
NITROMETHANE
Attempts at ultraviolet laser initiation of nitromethane and PETN [DE82-021253] N83-12430
NOAA 6 SATELLITE
Statistical and synoptic evaluations of TIROS-N and NOAA-6 retrievals [PB82-188053] N83-12826
NOISE (SOUND)
Noise source mechanisms in unsteady flow [PB82-203837] N83-12976
NOISE INTENSITY
National ambient noise survey [PB82-193681] N83-12671
NOISE MEASUREMENT
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual [PB82-178989] N83-12345
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility [NASA-TM-83969] N83-12396
Correlation of core noise obtained by three signal coherence techniques [NASA-TM-83012] N83-12966
Operational noise data for UH-60A and CH-47C Army helicopter [AD-A118796] N83-12974
NOISE PROPAGATION
Noise source mechanisms in unsteady flow [PB82-203837] N83-12976
NOISE REDUCTION
Aircraft noise reduction [PB82-206095] N83-12080
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis [DOT/FAA-RD-82-45-1] N83-12299
Design and experimental study of low noise hot-wire anemometer with constant current mode [NAL-TR-697] N83-12391
National ambient noise survey [PB82-193681] N83-12671
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise [AD-A118773] N83-12973
NOISE SPECTRA
Correlation of core noise obtained by three signal coherence techniques [NASA-TM-83012] N83-12966
NONAQUEOUS ELECTROLYTES
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization [AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations [AD-A118707] N83-12195
NONDESTRUCTIVE TESTS
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
Advances in nondestructive evaluation technology N83-12169
Development of a system to invert eddy-current data and reconstruct flaws --- circular cylindrical tubes [AD-A118767] N83-12442
Electromagnetic methods of nondestructive evaluation [AD-A118587] N83-12443
NONEQUILIBRIUM FLOW
Critical conditions and the choking mass flowrate in non-equilibrium wet steam flows [CUED/A-TURBO/TR-113] N83-12349
Non-equilibrium throughflow analyses of low pressure, wet steam turbines [CUED/A-TURBO/TR-116] N83-12350
NONFERROUS METALS
Electromagnetic methods of nondestructive evaluation [AD-A118587] N83-12443
NONFLAMMABLE MATERIALS
Application of thermochemical modeling to aircraft interior polymeric materials [NASA-CR-169384] N83-12237
NONLINEAR OPTICS
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability [AD-A118653] N83-12993
NONLINEAR SYSTEMS
Large displacements and stability analysis of nonlinear propeller structures N83-12460
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth [AD-A118597] N83-12942
NONLINEARITY
Virtual work, material inequalities and variational principles in structural mechanics [TR-10] N83-12445

NONPARAMETRIC STATISTICS
Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison
[DE81-701030] N83-12962
NONUNIFORM MAGNETIC FIELDS
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002
NORMAL DENSITY FUNCTIONS
Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397
Three-Bayesian estimation of a multinormal mean: An example
[TR-72] N83-12956
NOZZLE FLOW
Three dimensional flow computations in a turbine scroll
[NASA-CR-168003] N83-12045
The spreading rate of nonhomogeneous turbulent jets
[NAL-TR-701] N83-12347
NUCLEAR FUSION
Aerophysical aspects of gas and plasma flows
[AD-A118588] N83-12384
NUCLEAR PHYSICS
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058
NUCLEAR POWER PLANTS
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
Meteorological and hydrological aspects of siting and operation of nuclear power plants. Volume 2: Hydrological aspects
[WMO-550-VOL-2] N83-12989
NUCLEAR REACTORS
Mathematical methods in nuclear-reactor thermal hydraulics N83-12369
NULL ZONES
Nulling in linear array patterns with minimization of weight perturbations
[AD-A118695] N83-12310
Phase-only nulling as a least-square approximation to complex weight nulling
[AD-A118722] N83-12323
NUMERICAL ANALYSIS
Numerical Computation of Multi-phase Flows
[VKI-LS-1981-2] N83-12365
Numerical Computation of Multi-phase Flows: A course of twelve lectures and computer workshops N83-12366
Numerical computation of multi-phase fluid flow and heat transfer N83-12367
One-dimensional unsteady two-phase flows with interphase slip: A numerical study N83-12368
Introduction to multi-grid methods for the numerical solution of boundary value problems N83-12374
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
Guidelines for using the AMDLIB, IMSL and NAG mathematical software libraries at ANL
[ANL-81-73] N83-12684
Analytical and numerical study of resisting sheets and scattering from particles
[AD-A111240] N83-12933
NUMERICAL CONTROL
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] N83-12202
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual
[PB82-178989] N83-12345
NUMERICAL FLOW VISUALIZATION
Numerical simulation of inviscid compressible flow through two-dimensional cascade by finite area method
[NAL-TR-709] N83-12348
Higher level simulations of turbulent flows
[SU-TF-16] N83-12373
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] N83-12386
Numerical simulation of air pollutant spreading processes by transport equation N83-12629
NUMERICAL WEATHER FORECASTING
Objective forecasting of the heights of precipitation and of relative insolation by means of discriminatory analysis
[REPT-44] N83-12716
Major tasks of GATE N83-12725
Large-scale numerical modelling --- GARP Atlantic Tropical Experiment (GATE) N83-12730
Technique development for weather forecasting
[AD-A118744] N83-12781
The B-G system of evaluating forecasts
[AD-A118735] N83-12782

O

OBLIQUE SHOCK WAVES
Aerophysical aspects of gas and plasma flows
[AD-A118588] N83-12384
OBSERVATION
The prediction of a future observation by more than one Bayesian
[TR-68] N83-12953
OCEAN BOTTOM
Geotechnical, geoacoustical, and sedimentological properties of thirteen bottom sediment cores collected in the shallow water approaches to Norfolk, Virginia
[AD-A118166] N83-12832
OCEAN CURRENTS
System calibration strategies for spaceborne synthetic aperture radar
[PB82-182502] N83-12326
OCEAN DATA ACQUISITIONS SYSTEMS
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE --- first GARP Global Experiment (FGGE) N83-12735
World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802
Commission for Marine Technology: Abridged report of the 8th Session --- resolutions and recommendations for ocean exploration and exploitation
[WMO-584] N83-12803
OCEAN DYNAMICS
Major tasks of GATE N83-12725
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
OCEAN MODELS
Studies of large-scale thermal variability with a synoptic mixed layer model
[AD-A118159] N83-12833
OCEAN SURFACE
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808
OCEAN TEMPERATURE
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808
Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827
Studies of large-scale thermal variability with a synoptic mixed layer model
[AD-A118159] N83-12833
OCEAN THERMAL ENERGY CONVERSION
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661
OCEANOGRAPHIC PARAMETERS
Large-scale mean state N83-12727
OCEANOGRAPHY
Oceanographic applications of the Kalman filter
[NASA-TM-83993] N83-12829
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
OFFSHORE PLATFORMS
Multichannel maximum entropy method of spectral analysis applied to offshore structures
[PB82-182676] N83-12476
OIL POLLUTION
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630
OLIVINE
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017
OMEGA NAVIGATION SYSTEM
Omega data bank report (Spring through Fall, 1980)
[DOT/FAA-CT-82-5] N83-12062
ON-LINE SYSTEMS
On-Line Pattern Analysis and Recognition System, OLPARS 6. Programmer and system maintenance manual
[AD-A118731] N83-12899
On-line Pattern Analysis and Recognition System, OLPARS 6. Software reference manual
[AD-A118732] N83-12900
On-Line Pattern Analysis and Recognition System, OLPARS 6. Users manual
[AD-A118733] N83-12901
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
ONE DIMENSIONAL FLOW
Critical conditions and the choking mass flowrate in non-equilibrium wet steam flows
[CUED/A-TURBO/TR-113] N83-12349
One-dimensional unsteady two-phase flows with interphase slip: A numerical study N83-12368
OPERATING SYSTEMS (COMPUTERS)
DATAPOINT 8800 COBOL release 2.1
[PB82-195686] N83-12873
OPERATIONAL AMPLIFIERS
Reactanceless bandpass amplifier
[NASA-CASE-GSC-12788-1] N83-12333
OPERATORS (PERSONNEL)
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868
OPTICAL CORRECTION PROCEDURE
An interactive model for atmospheric correction in satellite images
[INPE-2500-PRE/182] N83-12681
OPTICAL EQUIPMENT
Tool for releasing optical elements
[NASA-CASE-GSC-12794-1] N83-12434
OPTICAL MEASURING INSTRUMENTS
A calibrator for optical instruments that measure Cn2 and crosswind
[PB82-188020] N83-12406
OPTICAL PROPERTIES
Performance comparison for Barnes model 12-1000, Exotech model 100, and Ideas Inc. Biometer Mark 2
[E83-10004] N83-12484
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
OPTICAL RADAR
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
Depth estimation in the airborne oceanographic LIDAR postflight bathymetry processor
[PB82-188194] N83-12838
OPTICAL RANGE FINDERS
Ranging system --- industrial robotics
[NASA-CASE-NPO-15865-1] N83-12991
OPTICAL REFLECTION
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability
[AD-A118653] N83-12993
OPTIMIZATION
Notes on coordinate generation: Fundamental ideas N83-12376
Computing a trust region step
[DE82-005656] N83-12905
Soviet mathematical programming
[AD-A116970] N83-12934
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935
ORBIT SPECTRUM UTILIZATION
Transmission and orbital constraints in space-related programs: Briefing summary, addendum
[AD-A118809] N83-12111
ORBITAL LAUNCHING
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132
ORBITAL MECHANICS
Studies of the aerodynamic forces on artificial satellites
[INPE-2387-PRE/107] N83-12123
ORBITS
Transmission and orbital constraints in space-related programs: Briefing summary, addendum
[AD-A118809] N83-12111

ORDER-DISORDER TRANSFORMATIONS
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017
ORDNANCE
Evaluation selection of encapsulating plastics for ordnance electronic assemblies
[AD-A118714] N83-12341
ORGANIC COMPOUNDS
Fireset materials aging study
[DE82-020368] N83-12170
ORGANISMS
Progress in the study of contamination effects in the marine environment --- effects on marine organisms N83-12615
Weather and airborne organisms
[WMO-562] N83-12793
ORGANOMETALLIC COMPOUNDS
Metal chelate catalysts for fuel cells
[PB82-195637] N83-12592
ORTHOGONALITY
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Simulation of the dropping mercury electrode by orthogonal collocation
[AD-A118689] N83-12187
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198
OSCILLATING FLOW
Unsteady boundary layer due to an oscillating free stream vs. an oscillating model
[AD-A118591] N83-12383
OSCILLATIONS
A regressive model of isochronism in speech units
[ISSN-0208-5654] N83-12291
OVENS
High performance crystal oscillator development
[AD-A118764] N83-12339
OXIDATION
Recent advances in carbon-carbon materials systems N83-12162
Turbine engine materials durability research N83-12163
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
OXYGEN
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
Singlet-oxygenation of a conjugated diallene: Attempt to prepare a stable divinyl peroxide
[AD-A118772] N83-12192
Photosynthetic water splitting
[PB82-200684] N83-12206
Separated-channel static-exchange calculations of the photoionization of the 1 Pi(g) orbital of O2
[PB82-187261] N83-12985
OZONE
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
Ozone problem in connection with monitoring the state of the atmosphere N83-12611

P

P WAVES
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049
PAINTS
Paint solubility testing
[PB82-177049] N83-12244
PARABOLIC REFLECTORS
Structural design considerations for a line-focus reflective module using inexpensive composite materials
[DE82-021611] N83-12587
PARAGUAY
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
PARALLEL COMPUTERS
NASTRAN of the HEP N83-12465
PARALLEL PROCESSING (COMPUTERS)
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916
PARAMETER IDENTIFICATION
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050
Recommendations for automated monitoring of radio equipment associated with flight service stations
[FAA-CT-82-31] N83-12298
PARAMETERIZATION
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions --- GARP Atlantic Tropical Experiment (GATE) N83-12733
Radiation processes and their parameterization --- GARP Atlantic Tropical Experiment (GATE) N83-12734
PARTICLE ACCELERATORS
Rail accelerator research at Lewis Research Center
[NASA-TM-83015] N83-12143
Injection of a high current beam into a modified betatron accelerator
[AD-A118581] N83-12980
PARTICLE COLLISIONS
Theoretical study of state-to-state collisions
[AD-A118586] N83-12979
PARTICLE DENSITY (CONCENTRATION)
The neutral particle density field around a satellite
[INPE-2504-PRE/185] N83-12126
PARTICLE DIFFUSION
On some pecularities of diffusion models in inhomogeneneous media N83-12653
PARTICLE SIZE DISTRIBUTION
The use of recrystallised RDX in cast RDX/TNT compositions
[MRL-R-805] N83-12245
Particle behaviour in flows and suitable particles for LDA measurements N83-12422
Measurements in particulate two phaseflows N83-12424
PARTICLES
Studies of particle motion by laser Doppler techniques N83-12414
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
Estimation of pollution concentration at Cacapava, SP, using a three dimensional numerical model
[INPE-2529-RPE/417] N83-12597
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657
Cirrus particle distribution study, part 8
[AD-A118715] N83-12783
PASCAL (PROGRAMMING LANGUAGE)
PASCAL compiler functional specification
[PB82-183989] N83-12876
Structured programming and PASCAL: A new programming language
[PB82-188921] N83-12913
PASSAGEWAYS
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360
PASSIVITY
GaAs surface passivation for device applications
[AD-A118777] N83-13014
PATTERN METHOD (FORECASTING)
Evaluation of technology assessments and development of evaluation protocols
[PB82-197385] N83-13026
PATTERN RECOGNITION
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
On-Line Pattern Analysis and Recognition System, OLPARS 6. Programmer and system maintenance manual
[AD-A118731] N83-12899
On-line Pattern Analysis and Recognition System, OLPARS 6. Software reference manual
[AD-A118732] N83-12900
On-Line Pattern Analysis and Recognition System, OLPARS 6. Users manual
[AD-A118733] N83-12901
Image understanding research
[AD-A118738] N83-12994
PAVEMENTS
Current practices on nighttime pavement construction asphaltic concrete
[DOT/FAA-RD-80-121] N83-12101
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283
Evaluation of Chem-Crete
[PB82-187808] N83-12284
PAYLOADS
Pointing payload for single tether balloons
[AD-A118770] N83-12054
Modified version of the TIROS N/NOAA A-G satellite series (NOAA E-J) advanced TIROS N (ATN)
[PB82-194044] N83-12131
Rail accelerator research at Lewis Research Center
[NASA-TM-83015] N83-12143
PEPTIDES
Pilot performance and stress: Search for a killer N83-12851
PERFLUORO COMPOUNDS
A neurobehavioral study of rats using a model perfluorinated acid, NDFDA
[AD-A118560] N83-12843
PERFORMANCE PREDICTION
The WISGSK: A computer code for the prediction of a multistage axial compressor performance with water ingestion
[NASA-CR-3624] N83-12093
PERFORMANCE TESTS
Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247
Passive-solar test modules
[DE82-021841] N83-12578
Verification tests of the Lectra Motors Corporation Lectra 2+2
[AD-A118718] N83-13040
PERIODIC VARIATIONS
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586
PERMEABILITY
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215
PEROXIDES
Singlet-oxygenation of a conjugated diallene: Attempt to prepare a stable divinyl peroxide
[AD-A118772] N83-12192
PERSONNEL DEVELOPMENT
Addendum to guidelines for the education and training of personnel in meteorology and operational hydrology. Part 2: Education and training of personnel in operational hydrology
[WMO-258] N83-12481
Manpower resources in Africa: Training requirements and opportunities --- meteorological services N83-12765
PESTICIDES
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom --- insecticides in the food chain N83-12634
Organochlorine pesticides in organisms of wild animals of terrestrial ecosystems --- in the U.S.S.R. N83-12636
Changes in the levels of DDE and polychlorinted biphenyl (PCB) contamination of California coastal waters, 1971 - 1977: Use of the mussel, Mytilus californianus, as an indicator species N83-12638
Study of wild animal pollution by pesticides: Methodological aspects N83-12642
Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651
PETN
Attempts at ultraviolet laser initiation of nitromethane and PETN
[DE82-021253] N83-12430
PETROLEUM PRODUCTS
Fireset materials aging study
[DE82-020368] N83-12170
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342
PHASE CHANGE MATERIALS
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
PHASE MODULATION
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889
PHASE TRANSFORMATIONS
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208
Diffusional transformations, strengthening mechanisms, and mechanical properties of uranium alloys
[DE82-020051] N83-12222

Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011

PHASED ARRAYS
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
Phase-only nulling as a least-square approximation to complex weight nulling
[AD-A118722] N83-12323

PHENOLOGY
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501

PHOSPHIDES
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

PHOSPHORIC ACID FUEL CELLS
Cell module and fuel conditioner development
[NASA-CR-165462-A] N83-12524

PHOSPHORUS
Anaerobic digestion of lime sludge
[AD-A118502] N83-12656
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010

PHOTOIONIZATION
Separated-channel static-exchange calculations of the photoionization of the 1 Pi(g) orbital of O2
[PB82-187261] N83-12985

PHOTOLYSIS
Attempts at ultraviolet laser initiation of nitromethane and PETN
[DE82-021253] N83-12430

PHOTONS
Instrumentation for LDA signal processing
N83-12421

PHOTOSYNTHESIS
Photosynthetic water splitting
[PB82-200684] N83-12206

PHOTOVOLTAIC CELLS
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Beverly High School, Beverly, Massachusetts
[DE82-006236] N83-12543
A survey of spectral response measurements for photovoltaic devices
[DE82-006221] N83-12545
J. F. Long experimental photovoltaic house
[DE82-020506] N83-12547
Analysis of small commercial photovoltaic applications
[DE82-020924] N83-12548
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
PV module degradation-analysis
[DE82-021123] N83-12570

PHOTOVOLTAIC EFFECT
Data report for the Northeast Residential Experiment Station, May 1982
[DE82-020398] N83-12553
Design and fabrication of a prototype system for photovoltaic residences in the Southwest
[DE82-020783] N83-12554
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] N83-12555

PHTHALOCYANIN
Metal phthalocyanine polymers
[NASA-CASE-ARC-11405-1] N83-12239

PHYSICAL OPTICS
Asymptotic theory of the scattering of axially symmetric reflectors
[INPE-2402-TDL/089] N83-12295

PHYSIOCHEMISTRY
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177

PHYSIOLOGICAL EFFECTS
Information load stress, risk taking and physiological responsivity in a visual-motor task
[AD-A118079] N83-12857

PHYSIOLOGICAL RESPONSES
Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system --- staining cell structures N83-12645
Reduction of voluntary dehydration during effort in hot environments
[NASA-TM-76956] N83-12849

PHYSIOLOGY
Second generation crop yield models review
[E83-10003] N83-12483

PIEZOELECTRIC TRANSDUCERS
Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399

PILOT ERROR
Pilot performance and stress: Search for a killer
N83-12851

PILOT PERFORMANCE
Pilot performance and stress: Search for a killer
N83-12851
Definition of Alaskan Aviation training requirements
N83-12852
The relationship between effort rating and performance in a critical tracking task
[FAA-EM-81-13] N83-12853

PILOT TRAINING
Pilot judgment training and evaluation, volume 1
[AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3
[AD-A117508] N83-12855

PILOTS
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858

PIPE FLOW
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12289
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416

PIPELINES
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12289

PIPES (TUBES)
Fracture analysis of PVC pipe materials
[R81-7] N83-12240

PIRANI GAGES
A bakable glass Pirani gauge for monitoring low vacuum
[PB82-190307] N83-12405

PISTONS
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-169474] N83-12214
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358

PIVOTS
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098

PLANE WAVES
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability
[AD-A118653] N83-12993

PLANETARY BOUNDARY LAYER
Scientific results of the Air Mass Transformation Experiment (AMTEX) --- sea surface/atmospheric interaction
[GARP-PUBL-SER-24] N83-12798
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045

PLANETARY WAVES
Synoptic-scale motions --- GARP Atlantic Tropical Experiment (GATE) N83-12728
Theoretical studies of tropical waves --- GARP Atlantic Tropical Experiment (GATE) N83-12729
Oceanographic applications of the Kalman filter
[NASA-TM-83993] N83-12829

PLANKTON
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661

PLANT DESIGN
Modular small hydro configuration
[PB82-184953] N83-12327

PLANT ROOTS
Study of pollutant migration processes in the soil-plant, soil-water system --- modeling N83-12640

PLANT STRESS
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488

PLANTING
Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744

PLANTS (BOTANY)
Second generation crop yield models review
[E83-10003] N83-12483
Developmental defects of plants as tests in monitoring environmental pollution N83-12644
The role of climatological information in the protection of plants and animals N83-12746

PLASMA COMPRESSION
Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] N83-12995

PLASMA CONTROL
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] N83-12996
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] N83-13003

PLASMA DENSITY
Dielectronic recombination of hydrogenic ions
[IPPJ-AM-23] N83-12977
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001

PLASMA DIAGNOSTICS
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001

PLASMA DISPLAY DEVICES
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004

PLASMA GENERATORS
High power microwave energy coupling to nitrogen during breakdown
[AD-A118520] N83-12999
The design, assembly and operation of an electric field dominated plasma facility
[AD-A118557] N83-13000

PLASMA GUNS
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004

PLASMA HEATING
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] N83-13008

PLASMA POWER SOURCES
Parallel plate radiofrequency ion thruster
[NASA-TM-83014] N83-12142

PLASMAS (PHYSICS)
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case
[DE82-020362] N83-12947
High power microwave energy coupling to nitrogen during breakdown
[AD-A118520] N83-12999
The design, assembly and operation of an electric field dominated plasma facility
[AD-A118557] N83-13000

PLASTIC COATINGS
Evaluation selection of encapsulating plastics for ordnance electronic assemblies
[AD-A118714] N83-12341

PLASTIC PROPERTIES
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473

PLASTICS
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428

PLOTTING
Recent improvements and enhancements to NASTRAN N83-12454
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview
[E83-10007] N83-12866
A fast hidden line algorithm for plotting finite element models
[NASA-TM-83981] N83-12879
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting
[NASA-TM-81374] N83-12881
Smoothing of scatterplots
[ORION-003] N83-12958

PLUMES
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666
PLUTONIUM 238
Space nuclear safety and fuels program
[DE82-004687] N83-12988
POINTING CONTROL SYSTEMS
Pointing payload for single tether balloons
[AD-A118770] N83-12054
POISSON EQUATION
Finite element solution of torsion and other 2-D Poisson equations N83-12463
POISSON RATIO
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868
POLAR REGIONS
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions
[PB82-198771] N83-12711
POLARIMETRY
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193
POLARIZATION CHARACTERISTICS
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation
[BBC-RD-1982/17] N83-12293
POLICIES
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
An appraisal of the programme --- Indian space program N83-12116
Mineral resources: Genetic understanding for practical applications
[PB82-182114] N83-12517
Integrated global monitoring of the environment: Policy and principles N83-12602
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
POLLUTION CONTROL
Problems of background monitoring of surface waters --- in the U.S.S.R. N83-12626
Review of atmospheric diffusion models for regulatory applications
[WMO-581] N83-12662
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674
POLLUTION MONITORING
On the Development of Multimedia Monitoring of Environmental Pollution --- conferences
[WMO-563] N83-12599
Basic principles and siting criteria for multimedia monitoring --- of environmental pollutants N83-12601
Integrated global monitoring of the environment: Policy and principles N83-12602
The WMO background air pollution monitoring network (BAPMON) N83-12604
Monitoring of the biosphere biological component --- environment pollution N83-12605
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606
Problems of air pollution monitoring --- in the U.S.S.R. N83-12607
On the scales of different air pollution processes --- from the local to the global N83-12608
Material on the background integrated monitoring of natural environmental pollution --- in the U.S.S.R. N83-12609
Monitoring of complementary parameters indispensable for interpretation and use of data on pollution in rainfall N83-12610
Ozone problem in connection with monitoring the state of the atmosphere N83-12611
Monitoring of world ocean pollution N83-12614
Hydrochemical observations at Lake Baikal. Present conditions --- pollution monitoring N83-12616
On the USSR national system of observations and assessment of long range transport of air pollutants N83-12618
Comments on the specifications of network stations for monitoring the variability of atmospheric trace constituents significant for climate N83-12619
Some principles of the interaction of a global monitoring system with national and regional natural environment pollution observation and information systems N83-12622
Problems of background monitoring of surface waters --- in the U.S.S.R. N83-12626
Monitoring requirements for biological systems --- in a global pollution context N83-12632
Developmental defects of plants as tests in monitoring environmental pollution N83-12644
Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system --- staining cell structures N83-12645
Methods for background monitoring of pollutants in natural media --- used in the U.S.S.R. N83-12649
Instruments and methods for monitoring background soil pollution --- in the U.S.S.R. N83-12650
Hydrological aspects of water quality monitoring under the conditions of anthropogenic impact N83-12654
Iowa air quality report, 1980
[PB82-189614] N83-12675
POLLUTION TRANSPORT
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
Estimation of pollution concentration at Cacapava, SP, using a three dimensional numerical model
[INPE-2529-RPE/417] N83-12597
On the USSR national system of observations and assessment of long range transport of air pollutants N83-12618
Aircraft and remote measurements of atmospheric transport of pollutants within the global integrated monitoring system N83-12620
Study of pollutant migration and transformation --- environmental monitoring in the U.S.S.R. N83-12623
Numerical simulation of air pollutant spreading processes by transport equation N83-12629
Study of pollutant migration processes in the soil-plant, soil-water system --- modeling N83-12640
Cycles of heavy metal migration in ecosystems of the Sikhote-Alin biospheric region N83-12641
A study of volatility, content dynamics and transformation of priority pollutants in atmospheric and aquatic environments --- herbicides N83-12643
Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651
Tropospheric chemistry and air pollution
[WMO-583] N83-12663
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion
[PB82-182098] N83-12672
POLYCHLORINATED BIPHENYLS
Changes in the levels of DDE and polychlorinted biphenyl (PCB) contamination of California coastal waters, 1971 - 1977: Use of the mussel, Mytilus californianus, as an indicator species N83-12638
POLYIMIDE RESINS
Polymer matrix composites research at NASA Lewis Research Center N83-12151
PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175
POLYMER CHEMISTRY
Polymer research at NASA Langley Research Center N83-12149
Polymer materials research at NASA Ames Research Center N83-12150
Polymer matrix composites research at NASA Lewis Research Center N83-12151
Polymer science and engineering: Challenges, needs and opportunities N83-12238
Stress relaxation of cellular silicone material: 1982
[DE82-020115] N83-12243
POLYMER MATRIX COMPOSITES
Concrete composites. Fiber reinforced polymer concretes: Properties and principles of use
[ISSN-0208-5658] N83-12171
POLYMER PHYSICS
Polymer science and engineering: Challenges, needs and opportunities N83-12238
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
POLYMERIZATION
Metal phthalocyanine polymers
[NASA-CASE-ARC-11405-1] N83-12239
POLYURETHANE FOAM
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342
POLYVINYL CHLORIDE
Fracture analysis of PVC pipe materials
[R81-7] N83-12240
POPULATION THEORY
Mathematical bases for modeling exogenic succession --- in an ecological system N83-12652
A two-stage elimination type procedure for selecting the largest of several normal means with a common unknown variance
[AD-A118501] N83-12943
POPULATIONS
On isotonic selection rules for binomial populations better than a standard
[AD-A118548] N83-12961
POROSITY
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835
POROUS MATERIALS
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967
POSITION (LOCATION)
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico
[FAA-RD-82-7] N83-12059
A modified Newton method for multilateration and its application to the RMS/MTTS system
[AD-A118728] N83-12122
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858
POSITION INDICATORS
Pointing payload for single tether balloons
[AD-A118770] N83-12054
POTENTIAL ENERGY
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785
POTENTIAL FLOW
The computation of transonic potential flow N83-12379
POWDER METALLURGY
Advanced Materials Technology
[NASA-CP-2251] N83-12147
Powder Metallurgy Alloys: Proceedings of the Symposium
[PB82-253931] N83-12227
Powder metallurgy of superalloys N83-12228
Production of titanium alloy powders N83-12229
Preparation of zirconium-nickel alloy by powder metallurgy N83-12232
The powder metallurgy of rare earth-cobalt permanent magnets N83-12234
POWDERED ALUMINUM
Advanced powder metallurgy aluminum alloys and composites N83-12156
POWERED LIFT AIRCRAFT
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092
PRECIPITATION (METEOROLOGY)
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
Background parameters of atmospheric precipitation chemical composition as siting criteria for global monitoring stations N83-12646
Research on the chemical composition of precipitation at background stations --- in the U.S.S.R. N83-12647
Objective forecasting of the heights of precipitation and of relative insolation by means of discriminatory analysis
[REPT-44] N83-12716
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118461] N83-12767
Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F
[AD-A118509] N83-12770
Seattle Tacoma IAP, Washington. Revised Unifrom Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118508] N83-12771
Bitburg Air Base, West Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118507] N83-12772
Natrona County/Casper, Wyoming. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118506] N83-12773
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118505] N83-12774

Revised Uniform Summary of Surface Weather Observations (RUSSWO). Fort Know/Godman AAF, Kentucky, parts A-F
[AD-A118462] N83-12777

Selection of distribution types for extremes of precipitation
[WMO-560] N83-12797

Methods of correction for systematic error in point precipitation measurement for operational use
[WMO-589] N83-12809

On the determination of precipitation efficiency
[PB82-184938] N83-12820

Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827

PRECISION

Automated balance for determining true mass
[DE82-021737] N83-12402

PREDICTION ANALYSIS TECHNIQUES

Application of Zimmerman flutter-margin criterion to a wind tunnel model
[NASA-TM-84545] N83-12070

Improved methods for predicting spectrum loading effects. Volume 1: Technical summary
[AD-A118656] N83-12077

Improved methods for predicting spectrum loading effects. Volume 2: Test data
[AD-A118657] N83-12078

A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097

Numerical Computation of Multi-phase Flows
[VKI-LS-1981-2] N83-12365

Forecasting the series of rainfalls at Fortaleza using the Burg maximum entropy method
[INPE-2546-RPE/420] N83-12722

Possibility of determining drought probability and using it in decision making N83-12738

Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744

Agrometeorological monitoring for crop prediction N83-12747

Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration
[NASA-CR-169476] N83-12880

The prediction of a future observation by more than one Bayesian
[TR-68] N83-12953

PRELAUNCH SUMMARIES

STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132

Mission operation report: Space Shuttle program
[NASA-TM-84889] N83-12134

PREMIXING

Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353

Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

PREPREGS

PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175

PRESSURE DISTRIBUTION

Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397

PRESSURE MEASUREMENT

Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247

Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273

Blade pressure measurements N83-12275

PRESSURE REDUCTION

An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048

PRESSURE REGULATORS

Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-12398

PRESSURE SENSORS

Blade pressure measurements N83-12275

Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399

PRESSURE VESSELS

Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212

Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438

PRESSURIZED WATER REACTORS

The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371

PRESSURIZING

The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371

PRIMITIVE EQUATIONS

A numerical study of vertical modes of a model of primitive equations
[INPE-2364-PRE/097] N83-12922

PRINTED CIRCUITS

Computer-aided process preparation for printed wiring boards
[DE82-004522] N83-12343

PROBABILITY DENSITY FUNCTIONS

Analysis of a function to approximate the envelope of a bandpass random signal
[AD-A118460] N83-12941

On a generalization of the matric-t distribution
[TR-71] N83-12955

PROBABILITY DISTRIBUTION FUNCTIONS

Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison
[DE81-701030] N83-12962

PROBABILITY THEORY

Detection of faulty inspection
[AD-A118549] N83-12441

Edgeworth expansions for linear combinations of order statistics
[MATH-CENTRE-TRACT-105] N83-12927

Uncertainty analysis
[DE82-020058] N83-12963

Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982

PROBES

Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982

PROBLEM SOLVING

The dredging dilemma: System problems and management solutions
[PB82-184979] N83-12288

Numerical Computation of Multi-phase Flows: A course of twelve lectures and computer workshops N83-12366

Starting step size for an ODE solver
[DE82-020422] N83-12904

Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925

Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930

AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945

Differential/algebraic systems and matrix pencils
[DE82-020138] N83-12946

PROCESS CONTROL (INDUSTRY)

Solidification process control for advanced superalloys N83-12155

Advanced powder metallurgy aluminum alloys and composites N83-12156

Advances in metals processing N83-12157

PROCESS HEAT

Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558

PROCUREMENT

Computerised book procurement system: System analysis
[PB82-188947] N83-13036

PRODUCTION ENGINEERING

High performance crystal oscillator development
[AD-A118764] N83-12339

PRODUCTIVITY

A review of the Energy Productivity Center's least cost energy strategy study
[PB82-188111] N83-12591

The physical working environment and its effect on productivity in offices
[PB82-186461] N83-12862

PROGRAM VERIFICATION (COMPUTERS)

The CARE 3 phase 3 report: Test and evaluation
[NASA-CR-3631] N83-12865

Burroughs Corporation large systems FORTRAN 77
[PB82-183153] N83-12872

National CSS, Incorporated, IBM 360/370 OS/VS COBOL release 2.3
[PB82-192964] N83-12874

Wang Laboratories Inc., VS COBOL version 3, 4, 1, technical report
[PB82-195629] N83-12875

Validation summary report; NCR Corporation V8570 VRX FORTRAN 10
[PB82-183641] N83-12877

The Sperry Univac V77 series: COBOL 74-800 release IRO
[PB82-193269] N83-12878

Sneak analysis application guidelines
[AD-A118479] N83-12887

Equivalence testing for FORTRAN mutation system using data flow analysis
[AD-A118840] N83-12896

IBM 3033 OS/VS COBOL release 2.3
[PB82-192766] N83-12909

Burroughs Corporation CP9572 CSM system COBOL release
[PB82-186933] N83-12910

Sperry Univac OS.3 COBOL version 07.00/58
[PB82-184920] N83-12911

The MODCOMP NASA extened FORTRAN 78
[PB82-183146] N83-12912

PROGRAMMING LANGUAGES

JOVIAL J73 programming support library
[AD-A118825] N83-12891

PROJECT MANAGEMENT

Draft supplement to final environmental impact statement, Space Shuttle program, Vandenberg AFB, California N83-12598

Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE --- first GARP Global Experiment (FGGE) N83-12735

World Weather Watch. Overall report on the Voluntary Cooperation Program, notably on projects approved for transmission to members of the WMO in 1980
[OMM-571] N83-12799

Systems engineering: A project planning and control methodology
[INPE-2496-PRE/179] N83-12965

PROJECT PLANNING

Concepts and techniques in hydrological network design
[WMO-580] N83-12515

Major tasks of GATE N83-12725

GATE observational strategy: A look in retrospect N83-12726

Climatic aspects of planning impoundments and hydropower operations N83-12754

World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795

World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802

Report of the second session of the Intergovernmental Planning Meeting on Alpex --- Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804

PROPAGATION MODES

The design of transitions in waveguides
[INPE-2369-PRE/409] N83-12328

PROPELLANT EXPLOSIONS

Deflagration-to-detonation in HMX-based propellants
[AD-A118616] N83-12251

PROPELLANT TANKS

Three stage rocket vehicle with parallel staging --- space transportation system
[NASA-CASE-MFS-25878-1] N83-12138

PROPELLANTS

Deflagration-to-detonation in HMX-based propellants
[AD-A118616] N83-12251

PROPELLERS

Large displacements and stability analysis of nonlinear propeller structures N83-12460

PROPULSION

QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092

PROPULSION SYSTEM CONFIGURATIONS

Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072

PROPULSION SYSTEM PERFORMANCE

Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094

Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report N83-12439

PROPULSIVE EFFICIENCY
Efficiency improved turboprop
[AD-A118819] N83-12096
PROTECTION
The role of climatological information in the protection of plants and animals N83-12746
PSYCHOLOGICAL TESTS
Models and estimation procedures for the analysis of subjects-by-items data arrays
[AD-A118730] N83-12856
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design
[AD-A118822] N83-12870
PSYCHOMETRICS
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design
[AD-A118822] N83-12870
PSYCHOMOTOR PERFORMANCE
The effect of the thermal conditions of training and testing on the performance of motor tasks measuring primary manual abilities
[AD-A118275] N83-12859
PULSE GENERATORS
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286
Ranging system --- industrial robotics
[NASA-CASE-NPO-15865-1] N83-12991
PULSED LASERS
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
Direct beam-quality measurement in pulsed aerodynamic windows
[DE82-019285] N83-12429
PULSES
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970
PUMP IMPELLERS
Laser Doppler measurements in transparent pump impellers N83-12272
PUMPS
Darrieus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] N83-12564

Q

QUADRATIC EQUATIONS
Computing a trust region step
[DE82-005656] N83-12905
QUADRUPOLES
Analysis of stabilization effect of quadrupole field on theta pinch plasmas
[IPPJ-608] N83-12995
QUALITY CONTROL
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177
QUANTUM ELECTRONICS
Solid state research, 1982-1
[AD-A118847] N83-13015
QUARTZ
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987
QUARTZ CRYSTALS
High performance crystal oscillator development
[AD-A118764] N83-12339

R

RADAR
Radar applications in cloud and clear-air studies
[PB82-192592] N83-12815
RADAR ANTENNAS
A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319
RADAR BEACONS
The AMPS computer system: Design and operation
[ATC-110] N83-12867
RADAR DETECTION
Radar waveform synthesis for target identification
[AD-A118572] N83-12316
RADAR EQUIPMENT
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
ARTS 2A design analysis
[FAA-RD-82-54] N83-12064
Radar applications in cloud and clear-air studies
[PB82-192592] N83-12815
RADAR IMAGERY
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
RADAR NAVIGATION
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
Construction, test and delivery of standardized coaxial magnetron
[AD-A118475] N83-12336
RADAR RESOLUTION
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
RADAR SCATTERING
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
RADAR TARGETS
Radar waveform synthesis for target identification
[AD-A118572] N83-12316
RADIAL DISTRIBUTION
Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397
RADIANCE
Winter wheat stand density determination and yield estimates from handheld and airborne scanners --- Montana
[E83-10013] N83-12492
RADIATION ABSORPTION
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
RADIATION DAMAGE
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987
RADIATION DISTRIBUTION
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
RADIATION EFFECTS
Durability of spacecraft materials N83-12165
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
RADIATION HARDENING
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
RADIATION HAZARDS
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
RADIATION MEASUREMENT
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004
RADIATION SPECTRA
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004
RADIATIVE HEAT TRANSFER
Integrated finite element thermal-structural analysis with radiation heat transfer
[NASA-TM-84469] N83-12356
RADIATIVE TRANSFER
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205
RADICALS
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186
RADIO ANTENNAS
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation
[BBC-RD-1982/17] N83-12293
RADIO COMMUNICATION
Proceedings of a Colloquium: Sporadic-E and its implications for Radio Communications
[PB82-186578] N83-12714
RADIO CONTROL
Recommendations for automated monitoring of radio equipment associated with flight service stations
[FAA-CT-82-31] N83-12298
RADIO EQUIPMENT
Recommendations for automated monitoring of radio equipment associated with flight service stations
[FAA-CT-82-31] N83-12298
RADIO FREQUENCIES
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
RADIO TELEMETRY
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
RADIOACTIVE WASTES
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705
RADIOACTIVITY
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594
RADIOMETERS
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual
[PB82-178999] N83-12345
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility
[NASA-TM-83969] N83-12396
Performance comparison for Barnes model 12-1000, Exotech model 100, and ideas Inc. Biometer Mark 2
[E83-10004] N83-12484
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513
RADIOSONDES
Sonde experiments for comparative measurements of optical turbulence
[AD-A118740] N83-12699
RADON
On the mechanisms of the deposition of atmospheric admixtures to the ground surface --- air pollution, aerosols N83-12628
RAIN
Monitoring of complementary parameters indispensable for interpretation and use of data on pollution in rainfall N83-12610
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
Forecasting the series of rainfalls at Fortaleza using the Burg maximum entropy method
[INPE-2546-RPE/420] N83-12722
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750
Harmonic analysis of normal pentad rainfall of Indian Stations
[PB82-186875] N83-12824
Pentad rainfall charts and space-time variations of rainfall over India and the adjoining areas
[PB82-187279] N83-12825
RAIN GAGES
Methods of correction for systematic error in point precipitation measurement for operational use
[WMO-589] N83-12809
RAIN IMPACT DAMAGE
Climatic effects on soil erosion in Zanzibar --- rainfall effects N83-12752
RAINDROPS
Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744
RAINSTORMS
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
Meteorology of important rainstorms in the Colorado River and Great Basin drainages
[PB82-185414] N83-12823

RANDOM ACCESS MEMORY
Calculation of cosmic-ray induced soft upsets and scaling in VLSI devices
[AD-A118584] N83-12871
RANDOM NOISE
Noise source mechanisms in unsteady flow
[PB82-203837] N83-12976
RANDOM VARIABLES
Edgeworth expansions for linear combinations of order statistics
[MATH-CENTRE-TRACT-105] N83-12927
RANGE (EXTREMES)
Selection of distribution types for extremes of precipitation
[WMO-560] N83-12797
RANGELANDS
Prediction of range production from weather records in Africa --- livestock breeding N83-12748
RANKINE CYCLE
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report N83-12439
RAPID QUENCHING (METALLURGY)
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
RARE EARTH ALLOYS
The powder metallurgy of rare earth-cobalt permanent magnets N83-12234
RATES (PER TIME)
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
Method of and apparatus for generating an interstitial point in a data stream having an even number of data points
[NASA-CASE-MFS-25319-1] N83-12932
RAYLEIGH SCATTERING
Applications of Rayleigh scattering to turbulent flows with heat transfer and combustion
[AD-A118576] N83-12385
RDX
The use of recrystallised RDX in cast RDX/TNT compositions
[MRL-R-805] N83-12245
REACTION KINETICS
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189
Photosynthetic water splitting
[PB82-200684] N83-12206
Effect of HERF on sintering kinetics of ferrographite composites N83-12231
Paint solubility testing
[PB82-177049] N83-12244
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696
REACTOR DESIGN
Fundamental air-gasification engineering parameters
[DE82-021612] N83-12200
Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438
Solve: A non linear least-squares code and its application to the optimal placement of torsatron vertical field coils
[DE82-015605] N83-12950
REACTOR MATERIALS
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212
REAL TIME OPERATION
A multi-site magnetotelluric measurement system with real-time data analysis
[DE82-020596] N83-12704
RECEIVERS
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
RECIRCULATIVE FLUID FLOW
Numerical methods for two- and three-dimensional viscous flows N83-12378
RECOMBINATION COEFFICIENT
Dielectronic recombination of hydrogenic ions
[IPPJ-AM-23] N83-12977
RECOMMENDATIONS
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A118692] N83-12055
RECRYSTALLIZATION
The use of recrystallised RDX in cast RDX/TNT compositions
[MRL-R-805] N83-12245
RECYCLING
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N83-12241
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573
REDUCTION (CHEMISTRY)
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186
REFERENCE ATMOSPHERES
Research on the chemical composition of precipitation at background stations --- in the U.S.S.R. N83-12647
REFINING
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N83-12241
REFLECTANCE
Computational modeling of multispectral remote sensing systems: Background investigations
[NASA-CR-165974] N83-12394
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
REFLECTOMETERS
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility
[NASA-TM-83969] N83-12396
REFLECTORS
Development of computer models for the prediction of large distorted antenna characteristics
[NASA-CR-169479] N83-12304
REFRACTIVITY
Measurements in liquid flows: Refractive index matching N83-12413
REFRACTORY MATERIALS
Research on ultra-high-temperature materials, monolithic ceramics, ceramic matrix composites and carbon/carbon composites N83-12161
Carbide-binder phases in cemented carbides N83-12233
REFRACTORY METAL ALLOYS
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
REFRIGERATING MACHINERY
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-12398
REFUELING
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100
REGIONAL PLANNING
Strategies for the amelioration of agricultural drought in Africa N83-12745
REGRESSION ANALYSIS
A regressive model of isochronism in speech units
[ISSN-0208-5658] N83-12291
Study of problems of ill-conditioned regression in the presence of multicollinearity
[INPE-2401-PRE/115] N83-12921
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
REGULATIONS
Mineral resources: Genetic understanding for practical applications
[PB82-182114] N83-12517
Review of atmospheric diffusion models for regulatory applications
[WMO-581] N83-12662
REINFORCEMENT
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283
REINFORCEMENT (STRUCTURES)
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
RELATIVISTIC ELECTRON BEAMS
Intense relativistic electron beam investigations
[AD-A118664] N83-12978
FX-25 and FX-100 propagation experiments
[AD-A118755] N83-12981
RELAXATION METHOD (MATHEMATICS)
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375
RELEASING
Tool for releasing optical elements
[NASA-CASE-GSC-12794-1] N83-12434
RELIABILITY
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
RELIABILITY ANALYSIS
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration
[NASA-CR-169476] N83-12880
Sneak analysis application guidelines
[AD-A118479] N83-12887
RELIABILITY ENGINEERING
RADC thermal guide for reliability engineers
[AD-A118839] N83-12338
The CARE 3 phase 3 report: Test and evaluation
[NASA-CR-3631] N83-12865
REMOTE CONSOLES
Operation plan for the data 100/LARS terminal system
[E83-10011] N83-12490
REMOTE SENSING
Applications of space science and technology --- Indian space program N83-12115
Computational modeling of multispectral remote sensing systems: Background investigations
[NASA-CR-165974] N83-12394
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508
Remote sensing in geology: Current trends and future prospects with satellite data
[INPE-2514-PRE/193] N83-12509
Atmospheric backscatter model development for CO sub 2 wavelengths
[NASA-CR-3638] N83-12682
REQUIREMENTS
Monitoring requirements for biological systems --- in a global pollution context N83-12632
RESEARCH AND DEVELOPMENT
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
State of space science and technology --- Indian space program N83-12114
Aeronautics research and technology. A review of proposed reductions in the FY 1983 NASA program
[NASA-CR-169386] N83-13024
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058
RESEARCH FACILITIES
International research laboratory on the Moon: A proposal for a national commitment
[DE82-010043] N83-12112
RESEARCH MANAGEMENT
Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 N83-12536
Biotechnology research requirements for aeronautical systems through the year 2000, volume 1
[AD-A118457] N83-12844
Biotechnology research requirements for aeronautical systems through the year 2000, volume 2
[AD-A118458] N83-12845
Solid state research, 1982-1
[AD-A118847] N83-13015
RESERVOIRS
Geothermal reservoir assessment, Roosevelt Hot Springs
[DE82-020632] N83-12541
RESIDENTIAL ENERGY
J. F. Long experimental photovoltaic house
[DE82-020506] N83-12547
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
Data report for the Northeast Residential Experiment Station, Apr. 1982
[DE82-021954] N83-12569
RESONANCE
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007
RESONANCE SCATTERING
Radar waveform synthesis for target identification
[AD-A118572] N83-12316

RESOURCES MANAGEMENT
The dredging dilemma: System problems and management solutions
[PB82-184979] N83-12288
Application of climate data and information in the management of water resources --- in Africa
N83-12755
RESPONSE TIME (COMPUTERS)
A technical analysis of rehosting the National Aerospace System software
[AD-A118828] N83-12069
RETROFITTING
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566
REUSABLE HEAT SHIELDING
Fibrous ceramic insulation N83-12160
REVERSED FLOW
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
REYNOLDS STRESS
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
RHEOLOGY
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177
Analysis of the properties of vibroisolating material described using the reological model
[ISSN-0208-5658] N83-12236
RICE
Rice scene radiation research plan N83-12496
RIDING QUALITY
Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072
RIGID STRUCTURES
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
RIGIDITY
Recent improvements and enhancements to NASTRAN N83-12454
RING STRUCTURES
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462
RISK
Information load stress, risk taking and physiological responsivity in a visual-motor task
[AD-A118079] N83-12857
Uncertainty analysis
[DE82-020058] N83-12963
RIVER BASINS
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
Use of river basin water quality monitoring data to analyze heavy metal input to the marine environment
N83-12625
ROBOTS
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861
Ranging system --- industrial robotics
[NASA-CASE-NPO-15865-1] N83-12991
ROCK MECHANICS
Rock mechanics investigation of two bed trona mining, Green River, Wyoming
[PB82-177312] N83-12709
ROCKET EXHAUST
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
ROCKS
Spectral properties of minerals and rocks and their applications in geology
[INPE-2515-NTE/192] N83-12691
Fracture analysis of crystalline rocks: Field measurements and field geomechanical techniques
[PB82-176678] N83-12712
ROTARY WING AIRCRAFT
Rotorcraft convertible engines for the 1980s
[NASA-TM-83003] N83-12091
ROTARY WINGS
Slack wire strike protection concepts
[AD-A118827] N83-12056
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972
ROTATING CYLINDERS
Computer program for a four-cylinder-Stirling-engine controls simulation
[NASA-TM-82774] N83-12359
ROTOR AERODYNAMICS
Rotor aerodynamics in ground effect at low advance ratios
[AD-A118609] N83-12051
ROTOR BLADES (TURBOMACHINERY)
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
RUBBER
Analysis of the properties of vibroisolating material described using the reological model
[ISSN-0208-5658] N83-12236
RUDDERS
Processing composite materials N83-12153
RUNWAY CONDITIONS
Current practices on nighttime pavement construction asphaltic concrete
[DOT/FAA-RD-80-121] N83-12101
RUNWAYS
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
RURAL LAND USE
Use of climatic information for land use planning and crop diversification --- in Africa N83-12742
RUTHENIUM COMPOUNDS
New laser dye systems based on transition metal complexes
[AD-A118699] N83-12426

S

SAFETY
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286
Space nuclear safety and fuels program
[DE82-004687] N83-12988
SAFETY MANAGEMENT
Effects of metric change on safety in the workplace for selected occupations
[AD-A118595] N83-12279
New directions in office planning: The influence of the fire properties of materials and components on fire safety
[PB82-191214] N83-12290
Safety data for small wind systems
[DE82-015400] N83-12565
SAINT VENANT PRINCIPLE
Finite element solution of torsion and other 2-D Poisson equations N83-12463
SALT BEDS
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
SAMPLING
Paint solubility testing
[PB82-177049] N83-12244
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835
Uncertainty analysis
[DE82-020058] N83-12963
SANDSTONES
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708
SAPPHIRE
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987
SATELLITE ATTITUDE CONTROL
Conditions of attitude stability for a flexible satellite
[INPE-2389-PRE/109] N83-12125
Flexible satellite orientation, using the modal-analysis method for gyroscopic systems
[INPE-2505-PRE/186] N83-12127
Digital solar sensor project for attitude determination
[INPE-2495-PRE/178] N83-12392
SATELLITE OBSERVATION
Conference on Using Next Generation Earth Observation Satellites: Summary handbook
N83-12508
GATE observational strategy: A look in retrospect
N83-12726
SATELLITE ORBITS
Studies of the aerodynamic forces on artificial satellites
[INPE-2387-PRE/107] N83-12123
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
SATELLITE ORIENTATION
Conditions of attitude stability for a flexible satellite
[INPE-2389-PRE/109] N83-12125
SATELLITE PERTURBATION
Studies of the aerodynamic forces on artificial satellites
[INPE-2387-PRE/107] N83-12123
Perturbation of artificial satellites due to tides
[INPE-2388-PRE/108] N83-12124
SATELLITE TRACKING
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187931] N83-12108
SATELLITE TRANSMISSION
Television receiver, 4 GHz
[INPE-2478-PRE/164] N83-12301
Receiving station for WEFAX signals
[INPE-2501-NTE/191] N83-12307
SATELLITE-BORNE INSTRUMENTS
Modified version of the TIROS N/NOAA A-G satellite series (NOAA E-J) advanced TIROS N (ATN)
[PB82-194044] N83-12131
Operation of the rapid scan particle spectrometer SC5 on the SCATHA satellite
[AD-A118724] N83-12401
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057
SATELLITES
Performance measures for multiprocessor controllers
[NASA-CR-169482] N83-12868
SCALE (RATIO)
On the scales of different air pollution processes --- from the local to the global N83-12608
SCALING LAWS
Calculation of cosmic-ray induced soft upsets and scaling in VLSI devices
[AD-A118584] N83-12871
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045
SCANNERS
Operation of the rapid scan particle spectrometer SC5 on the SCATHA satellite
[AD-A118724] N83-12401
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992
SCANNING
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198
SCATHA SATELLITE
Development of electrical test procedures for qualification of spacecraft against EID. Volume 1: The CAN test and other relevant data
[NASA-CR-165590] N83-12136
Development of electrical test procedures for qualification of spacecraft against EID. Volume 2: Review and specification of test procedures
[NASA-CR-165590] N83-12137
Operation of the rapid scan particle spectrometer SC5 on the SCATHA satellite
[AD-A118724] N83-12401
SCATTER PLATES (OPTICS)
Scatterplate flux mapping for solar concentrators
[DE82-021359] N83-12588
SCATTERING COEFFICIENTS
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke
[PB82-188813] N83-12715
SCATTEROMETERS
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
SCENE ANALYSIS
Software for three dimensional topographic sciences
[AD-A118465] N83-12898

SCHEDULING
Current practices on nighttime pavement construction asphaltic concrete
[DOT/FAA-RD-80-121] N83-12101
SCHOOLS
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Beverly High School, Beverly, Massachusetts
[DE82-006236] N83-12543
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
SCHOTTKY DIODES
Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
SCINTILLATION
Sonde experiments for comparative measurements of optical turbulence
[AD-A118740] N83-12699
SEA BREEZE
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
SEA ICE
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
Feasibility of acoustically determining the thickness of sea ice
[AD-A118499] N83-12830
SEA LEVEL
Possible changes in sea level and their causes
[DE82-013848] N83-12836
SEA WATER
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
SEDIMENT TRANSPORT
Sources, composition and transport of suspended particulate matter in Lower Cook Inlet and Northwestern Shelikof Strait, Alaska
[PB82-193236] N83-12837
SEDIMENTS
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657
Preliminary investigations: Archaeology and sediment geomorphology, navigation pool 12, Upper Mississippi River. Volume 2. Technical documents and site data sheets
[AD-A118798] N83-12698
Geotechnical, geoacoustical, and sedimentological properties of thirteen bottom sediment cores collected in the shallow water approaches to Norfolk, Virginia
[AD-A118166] N83-12832
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835
Sources, composition and transport of suspended particulate matter in Lower Cook Inlet and Northwestern Shelikof Strait, Alaska
[PB82-193236] N83-12837
SEEDS
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482
SEISMIC WAVES
A model for tectonic strain release from explosions in complex prestress fields applied to anomalous seismic waves from NTS and eastern Kazakh explosions
[AD-A118503] N83-12697
SELENIDES
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016
SEMANTICS
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
Algorithmic complexity, volume 2
[AD-A118814] N83-12892
Algorithms for program verification
[AD-A118570] N83-12894
SEMICONDUCTOR DEVICES
GaAs surface passivation for device applications
[AD-A118777] N83-13014
SEMICONDUCTORS (MATERIALS)
Solid state research, 1982-1
[AD-A118847] N83-13015
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018
SENSITIVITY
AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945
SEPARATED FLOW
Stewartson's triple deck
[AD-A118617] N83-12381
SERVICE LIFE
Materials constitutive models for nonlinear analysis of thermally cycled structures
[NASA-TP-2055] N83-12449
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
SERVICES
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
SETUPS
Lay-out of optical systems for laser Doppler anemometers N83-12412
SEWAGE TREATMENT
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670
SHALE OIL
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571
SHALLOW WATER
Wave spectral transformation in shallow water
[AD-A118496] N83-12831
SHAPE MEMORY ALLOYS
Shape-memory resistivity behavior of transformation-fatigue-cycled nickel-titanium wires near the equiatomic composition
[DE82-018272] N83-12226
SHEAR FLOW
Turbulent solution of the Navier-Stokes equations for an inhomogenous developing shear layer
[NASA-TM-82969] N83-12357
SHEAR LAYERS
Turbulent solution of the Navier-Stokes equations for an inhomogenous developing shear layer
[NASA-TM-82969] N83-12357
SHEAR PROPERTIES
The transiton and dynamics of bounded and free shear layers
[AD-A118665] N83-12380
SHEAR STRESS
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
SHIP HULLS
A guide to the principal marine fouling organisms, with particular reference to Cockburn Sound, Western Australia
[MRL-R-858] N83-12842
SHOCK TUBES
Direct beam-quality measurement in pulsed aerodynamic windows
[DE82-019285] N83-12429
SHORT HAUL AIRCRAFT
Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072
SHORT TAKEOFF AIRCRAFT
An engine installation for fan jet STOL aircraft using USB powered high lift system (I) engine matching test for circular confluent exhaust duct
[NAL-TR-703] N83-12086
SHUTTLE DERIVED VEHICLES
Three stage rocket vehicle with parallel staging --- space transportation system
[NASA-CASE-MFS-25878-1] N83-12138
SIDE-LOOKING RADAR
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713
SIDELOBES
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
Phase-only nulling as a least-square approximation to complex weight nulling
[AD-A118722] N83-12323
SIGNAL ANALYSIS
Introduction to LDA signal analysis and signal processing N83-12418
Instrumentation for LDA signal processing N83-12421
SIGNAL FADING
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297
SIGNAL PROCESSING
Advances in nondestructive evaluation technology N83-12169
Construction, test and delivery of standardized coaxial magnetron
[AD-A118475] N83-12336
Introduction to LDA signal analysis and signal processing N83-12418
Signal processing by counters and digital processing of LDA signals N83-12419
Instrumentation for LDA signal processing N83-12421
Particle behaviour in flows and suitable particles for LDA measurements N83-12422
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889
SIGNAL RECEPTION
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
Receiving station for WEFAX signals
[INPE-2501-NTE/191] N83-12307
SIGNAL TO NOISE RATIOS
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302
SIGNAL TRANSMISSION
Signal transmission via sliprings and telemetry N83-12267
SIGNATURE ANALYSIS
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee
[E83-10006] N83-12486
SILICA GLASS
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987
SILICATES
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
SILICON
Industrial ion source technology
[NASA-CR-159877] N83-12259
Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] N83-12552
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials
[NASA-CASE-NPO-15851-1] N83-12986
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016
Structure and electronic studies of defects in amorphous silicon
[DE82-018228] N83-13021
SILICON CARBIDES
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018
SILICONES
Stress relaxation of cellular silicone material: 1982
[DE82-020115] N83-12243
SIMILARITY THEOREM
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045
SIMULATION
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments
[AD-A118710] N83-12197
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695
A study of the feasibility of statistical analysis of airport performance simulation
[NASA-CR-3633] N83-12959
SIMULTANEOUS EQUATIONS
Identification and Informative Sample Size
[REPT-147] N83-12924
SINE WAVES
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967

SINGLE CHANNEL PER CARRIER TRANSMISSION
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302
SINGLE CRYSTALS
A survey of spectral response measurements for photovoltaic devices
[DE82-006221] N83-12545
Orientation dependence of the stress rupture properties of Nickel-base superalloy single crystals
[NASA-CR-165394] N83-13009
HgCdTe fabrication using directed energy techniques
[AD-A118654] N83-13013
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018
SINTERING
Some studies on the aluminium alloy formation during sintering of metal powders N83-12230
Effect of HERF on sintering kinetics of ferrographite composites N83-12231
SITE SELECTION
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526
Site characteristics for wind energy conversion devices N83-12528
Basic principles and siting criteria for multimedia monitoring --- of environmental pollutants N83-12601
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS)
[DE82-017394] N83-12788
Meteorological and hydrological aspects of siting and operation of nuclear power plants. Volume 2: Hydrological aspects
[WMO-550-VOL-2] N83-12989
Man in space
[PB82-186784] N83-13023
SIZE (DIMENSIONS)
Experimental studies of the effect of scale on the stressing of metals
[ISSN-0208-5658] N83-12211
SIZE DISTRIBUTION
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835
SKIN FRICTION
A nonintrusive laser interferometer method for measurement of skin friction
[NASA-TM-84300] N83-12393
SLABS
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
SLAGS
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] N83-13005
SLIP FLOW
Developments in the procedure for numerical computation of multi-phase-flow phenomena with inter-phase slip, unequal temperatures, et cetera N83-12370
SLIPSTREAMS
Signal transmission via sliprings and telemetry N83-12267
SLUDGE
Anaerobic digestion of lime sludge
[AD-A118502] N83-12656
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670
SLURRIES
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12289
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
SMOOTHING
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889
SNOW
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York
[AD-A118471] N83-12776
SNOW COVER
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements
[AD-A118751] N83-12779
SOCIAL FACTORS
Assessing the impact of climate on society: A research review N83-12764
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861
SODIUM
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
Solar tide in the atmospheric sodium layer
[INPE-2449-PRE/147] N83-13046
SODIUM CHLORIDES
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat
[NASA-TM-76955] N83-12848
Role of laser-induced primary-defect formation in optical breakdown in NaCl
[DE82-002062] N83-13020
SOFTWARE TOOLS
PASCAL compiler functional specification
[PB82-183989] N83-12876
JOVIAL J73 programming support library
[AD-A118825] N83-12891
SOIL EROSION
Climatic effects on soil erosion in Zanzibar --- rainfall effects N83-12752
SOIL MAPPING
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
SOIL MECHANICS
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12888
SOIL MOISTURE
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery --- Kansas
[E83-10020] N83-12503
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
Study of pollutant migration processes in the soil-plant, soil-water system --- modeling N83-12640
SOIL SCIENCE
Extraterrestrial materials processing and construction --- space industrialization
[NASA-CR-167756] N83-12109
SOILS
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473
Instruments and methods for monitoring background soil pollution --- in the U.S.S.R. N83-12650
SOLAR ACTIVITY
The Pinhole/Occulter facility
[NASA-TP-2089] N83-13048
Annotated atlas of H-alpha synoptic charts
[AD-A118170] N83-13053
SOLAR ACTIVITY EFFECTS
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049
SOLAR ARRAYS
Analysis of small commercial photovoltaic applications
[DE82-020924] N83-12548
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
SOLAR CELLS
Analysis of small commercial photovoltaic applications
[DE82-020924] N83-12548
High-intensity solar cells
[DE82-020420] N83-12550
Concentrator-solar-cell development
[DE82-020119] N83-12551
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] N83-12552
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
Solar-cell testing and evaluation
[DE82-016179] N83-12562
PV module degradation-analysis
[DE82-021123] N83-12570
SOLAR COLLECTORS
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] N83-12386
Stevens Home, Rancho Santa Fe, California: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021698] N83-12538
Kalin Home, Long Island, New York: Solar-energy-system performance evaluation, Sep. 1981-Mar. 1982
[DE82-021701] N83-12539
EROS Data Center, Sioux Falls, South Dakota: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021703] N83-12540
Solar thermal industry status and future needs
[DE82-020885] N83-12546
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan. 1982 - Apr. 1982
[DE82-021299] N83-12575
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586
Scatterplate flux mapping for solar concentrators
[DE82-021359] N83-12588
SOLAR CONSTANT
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787
SOLAR COOLING
Solar thermal industry status and future needs
[DE82-020885] N83-12546
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
SOLAR CORONA
The Pinhole/Occulter facility
[NASA-TP-2089] N83-13048
SOLAR CORPUSCULAR RADIATION
Solar-geophysical data. Comprehensive reports
[PB82-197302] N83-13052
SOLAR CYCLES
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057
SOLAR ENERGY
Solar thermal industry status and future needs
[DE82-020885] N83-12546
Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563
Methodologies for assessing solar energy potential --- in Africa N83-12758

SOLAR ENERGY CONVERSION
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] N83-12555
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects. Volume 3. Utility load management project
[DE82-007247] N83-12559
SOLAR FLARES
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4
[NASA-TM-84929] N83-13047
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050
Solar-geophysical data. Comprehensive reports
[PB82-197302] N83-13052
Solar-geophysical data. Comprehensive reports
[PB82-195801] N83-13054
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
SOLAR FLUX DENSITY
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
SOLAR GENERATORS
ROSET: A solar-thermal electric-power simulation users guide
[DE82-021997] N83-12567
SOLAR HEATING
Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] N83-12287
Stevens Home, Rancho Santa Fe, California: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021698] N83-12538
Kalin Home, Long Island, New York: Solar-energy-system performance evaluation, Sep. 1981-Mar. 1982
[DE82-021701] N83-12539
EROS Data Center, Sioux Falls, South Dakota: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021703] N83-12540
Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations
[DE82-002758] N83-12560
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan. 1982 - Apr. 1982
[DE82-021299] N83-12575
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
Passive-solar test modules
[DE82-021841] N83-12578
Environmental partnership, Cream Ridge, New Jersey: Solar-energy-system performance evaluation, October 1981 through March 1982
[DE82-021303] N83-12579
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589
SOLAR HOUSES
J. F. Long experimental photovoltaic house
[DE82-020506] N83-12547
Passive solar energy in Washington: Results of the Washington passive solar design/build/competition
[DE82-020394] N83-12549
Data report for the Northeast Residential Experiment Station, May 1982
[DE82-020398] N83-12553
Design and fabrication of a prototype system for photovoltaic residences in the Southwest
[DE82-020783] N83-12554
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
Solar home show: Homes designed for the solar homebuilders program
[DE82-020255] N83-12557
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566
Data report for the Northeast Residential Experiment Station, Apr. 1982
[DE82-021954] N83-12569
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
Environmental partnership, Cream Ridge, New Jersey: Solar-energy-system performance evaluation, October 1981 through March 1982
[DE82-021303] N83-12579
SOLAR MAGNETIC FIELD
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050
Annotated atlas of H-alpha synoptic charts
[AD-A118170] N83-13053
SOLAR OSCILLATIONS
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049
SOLAR RADIATION
Pointing performance of the 8300 series Datron antennas
[AD-A118660] N83-12311
Problems of air pollution monitoring --- in the U.S.S.R. N83-12607
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057
SOLAR RADIO EMISSION
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050
Solar-geophysical data. Comprehensive reports
[PB82-197302] N83-13052
Solar-geophysical data. Comprehensive reports
[PB82-195801] N83-13054
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
Solar-Geophysical Data. Part 2: Comprehensive Reports. Number 448: Data for June 1981 and miscellanea
[PB82-184748] N83-13056
SOLAR REFLECTORS
Structural design considerations for a line-focus reflective module using inexpensive composite materials
[DE82-021611] N83-12587
SOLAR SENSORS
Digital solar sensor project for attitude determination
[INPE-2495-PRE/178] N83-12392
SOLAR TERRESTRIAL INTERACTIONS
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions
[PB82-198771] N83-12711
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
SOLAR WIND
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110
The Pinhole/Occulter facility
[NASA-TP-2089] N83-13048
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
SOLAR X-RAYS
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4
[NASA-TM-84929] N83-13047
Solar-geophysical data. Comprehensive reports
[PB82-197302] N83-13052
Solar-geophysical data. Comprehensive reports
[PB82-195801] N83-13054
Solar-Geophysical Data. Part 2: Comprehensive Reports. Number 448: Data for June 1981 and miscellanea
[PB82-184748] N83-13056
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057
SOLID PROPELLANT IGNITION
Experiments on the aft-end ignition of solid propellant rocket
[NAL-TR-694] N83-12139
SOLID PROPELLANT ROCKET ENGINES
Experiments on the aft-end ignition of solid propellant rocket
[NAL-TR-694] N83-12139
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
SOLID PROPELLANTS
The use of recrystallised RDX in cast RDX/TNT compositions
[MRL-R-805] N83-12245
SOLID ROCKET PROPELLANTS
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
Combustion instability in solid propellants
[INPE-2507-PRE/187] N83-12249
SOLID STATE DEVICES
Solid state research, 1982-1
[AD-A118847] N83-13015
SOLID STATE PHYSICS
Solid state research, 1982-1
[AD-A118847] N83-13015
SOLID SURFACES
Application of thin film solid sorbents for estimation of SO2 background concentrations N83-12655
SOLID WASTES
Test methods for evaluating solid waste: Physical/chemical methods
[PB82-172156] N83-12210
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
SOLIDIFICATION
Solidification process control for advanced superalloys N83-12155
Materials processing in space N83-12166
SOLIDS
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials
[NASA-CASE-NPO-15851-1] N83-12986
SOLIDS FLOW
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12289
Experimental investigation of transport of discrete solids with surge flows in a 10.0 cm diameter partially filled pipe
[PB82-178724] N83-12389
SOLUBILITY
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215
Paint solubility testing
[PB82-177049] N83-12244
SONOBUOYS
Hybrid tracking algorithm improvements and cluster analysis methods
[AD-A118470] N83-12944
SOOT
Soot formation in synfuels
[DE82-004271] N83-12199
SORBENTS
Application of thin film solid sorbents for estimation of SO2 background concentrations N83-12655
SORGHUM
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
SOUND INTENSITY
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967
SOUND PRESSURE
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971
Noise source mechanisms in unsteady flow
[PB82-203837] N83-12976
SOUND TRANSMISSION
Stereophonic and two channel sound in terrestrial television broadcasting
[BBC-RD-1982/18] N83-12292
Development of an airborne sonic thermometer
[AD-A118774] N83-12400

SOUNDING ROCKETS
Development of an ion mass spectrometer and sounding rocket system for D-region cluster-ion measurements
[AD-A118752] N83-12191
SOUTH AMERICA
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
Air Weather Service (AWS) climatic briefs: Latin America
[AD-A118449] N83-12769
SOUTH DAKOTA
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data --- South Dakota
[E83-10008] N83-12487
SOUTHERN CALIFORNIA
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project
[E83-10024] N83-12507
SOUTHERN HEMISPHERE
Baroclinic analysis of the Southern Hemisphere
[INPE-2541-PRE/203] N83-12683
Ge(Li) telescope for observing atmospheric gamma ray lines in the Southern Hemisphere
[INPE-2513-PRE/192] N83-12686
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
SOYBEANS
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee
[E83-10006] N83-12486
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
SPACE COMMUNICATION
Design concepts for a high-impedance narrow-band 42 GHz power TWT using a fundamental/forward ladder-based circuit
[NASA-CR-165282] N83-12330
Data management and computation. Volume 1: Issues and recommendations
[PB82-188113] N83-13035
SPACE EXPLORATION
Transmission and orbital constraints in space-related programs: Briefing summary, addendum
[AD-A118809] N83-12111
SPACE HEATING (BUILDINGS)
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan. 1982 - Apr. 1982
[DE82-021299] N83-12575
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
Passive-solar test modules
[DE82-021841] N83-12578
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
SPACE INDUSTRIALIZATION
Extraterrestrial materials processing and construction --- space industrialization
[NASA-CR-167756] N83-12109
SPACE LAW
International issues N83-12118
SPACE PROBES
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110
SPACE PROCESSING
Materials processing in space N83-12166
SPACE PROGRAMS
International research laboratory on the Moon: A proposal for a national commitment
[DE82-010043] N83-12112
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296
Man in space
[PB82-186784] N83-13023
SPACE SHUTTLE ORBITERS
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133
Strain gage load measurement on the shuttle orbiter
[NASA-TM-84898] N83-12135
Recent advances in carbon-carbon materials systems N83-12162
SPACE SHUTTLE PAYLOADS
The usage of substructuring analyses in the Get Away Special (GAS) program N83-12466
SPACE SHUTTLES
Fibrous ceramic insulation N83-12160
Draft supplement to final environmental impact statement, Space Shuttle program, Vandenberg AFB, California N83-12598
SPACE TRANSPORTATION SYSTEM
Three stage rocket vehicle with parallel staging --- space transportation system
[NASA-CASE-MFS-25878-1] N83-12138
SPACE TRANSPORTATION SYSTEM 5 FLIGHT
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132
Mission operation report: Space Shuttle program
[NASA-TM-84889] N83-12134
SPACEBORNE ASTRONOMY
The future of high energy gamma ray astronomy and its potential astrophysical implications
[NASA-TM-83986] N83-13042
SPACEBORNE EXPERIMENTS
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132
Thermal control system
[NASA-CASE-GSC-12771-1] N83-12361
SPACECRAFT CHARGING
High-level spacecraft charging environments near geosynchronous orbit
[AD-A118791] N83-12130
Development of electrical test procedures for qualification of spacecraft against EID. Volume 1: The CAN test and other relevant data
[NASA-CR-165590] N83-12136
Development of electrical test procedures for qualification of spacecraft against EID. Volume 2: Review and specification of test procedures
[NASA-CR-165590] N83-12137
SPACECRAFT COMPONENTS
Durability of spacecraft materials N83-12165
SPACECRAFT CONFIGURATIONS
The neutral particle density field around a satellite
[INPE-2504-PRE/185] N83-12126
SPACECRAFT CONSTRUCTION MATERIALS
Design, fabrication and test of graphite/polyimide composite joints and attachments --- spacecraft control surfaces
[NASA-CR-165955] N83-12450
SPACECRAFT DESIGN
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements
[NASA-CR-2984] N83-12073
SPACECRAFT INSTRUMENTS
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-12398
SPACECRAFT LAUNCHING
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit
[NASA-TM-84890] N83-12132
SPACECRAFT MOTION
Effects of motion of the equatorial plane on equatorial elements of an Earth satellite
[NAL-TR-695] N83-12120
SPACECRAFT ORBITS
Effects of motion of the equatorial plane on equatorial elements of an Earth satellite
[NAL-TR-695] N83-12120
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889] N83-12145
Computer modeling of a wideswath SAR concept employing multiple antenna beam formation techniques
[NASA-CR-167757] N83-12305
SPACECRAFT POWER SUPPLIES
Space nuclear safety and fuels program
[DE82-004687] N83-12988
SPACECRAFT PROPULSION
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889] N83-12145
SPACECRAFT SHIELDING
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133
SPACECRAFT STRUCTURES
Durability of spacecraft materials N83-12165
Design, fabrication and test of graphite/polyimide composite joints and attachments --- spacecraft control surfaces
[NASA-CR-165955] N83-12450
SPACECRAFT TRAJECTORIES
Optimal low-thrust Earth escape spiral trajectories from geosynchronous orbit
[NAL-TR-704] N83-12121
SPARK IGNITION
Status of alcohol-fuels-utilization technology for highway transportation: A 1981 perspective. Volume 1. Spark-ignition engines
[DE82-020493] N83-12255
SPATIAL DISTRIBUTION
Static testing to evaluate airtanker delivery performance --- distribution of flame retardants in forest fires
[PB82-179946] N83-12079
Development of advanced acreage estimation methods
[E83-10015] N83-12494
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
The possible modifications of the Hisse model for pure LANDSAT agricultural data N83-12497
On the spatial interpolation of air pollution fields N83-12621
National ambient noise survey
[PB82-193681] N83-12671
SPECIFICATIONS
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
Algorithms for program verification
[AD-A118570] N83-12894
SPECTRAL REFLECTANCE
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
A survey of spectral response measurements for photovoltaic devices
[DE82-006221] N83-12545
SPECTRAL SIGNATURES
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data --- South Dakota
[E83-10008] N83-12487
Development of advanced acreage estimation methods
[E83-10015] N83-12494
Rice scene radiation research plan N83-12496
The possible modifications of the Hisse model for pure LANDSAT agricultural data N83-12497
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
Wave spectral transformation in shallow water
[AD-A118496] N83-12831
SPECTROGRAPHS
A software system for emission spectrometry
[NASA-TM-83001] N83-12181
SPECTROMETERS
A software system for emission spectrometry
[NASA-TM-83001] N83-12181
Operation of the rapid scan particle spectrometer SC5 on the SCATHA satellite
[AD-A118724] N83-12401
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992

SPECTROSCOPY
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
SPECTRUM ANALYSIS
Introduction to LDA signal analysis and signal processing N83-12418
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433
Multichannel maximum entropy method of spectral analysis applied to offshore structures
[PB82-182676] N83-12476
Possibility of detecting the nuclear gamma line at 6.13 MeV of atmospheric and cosmic origin O(16) --- line spectra
[INPE-2511-PRE/190] N83-12684
SPEECH
A regressive model of isochronism in speech units
[ISSN-0208-5658] N83-12291
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
SPIN REDUCTION
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
SPINEL
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017
SPLINE FUNCTIONS
Multidimensional additive spline approximation
[SU-ORION-006] N83-12931
Properties of the Wilson-Fowler spline
[DE82-020106] N83-12949
SPORADIC E LAYER
Proceedings of a Colloquium: Sporadic-E and its implications for Radio Communications
[PB82-186578] N83-12714
SPRAYERS
An experimental and analytical study on spray flow field by liquid/gas coaxial injector elements (I)
[NAL-TR-692] N83-12346
SPREAD F
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695
SPREAD SPECTRUM TRANSMISSION
Advanced communication system studies
[AD-A118561] N83-12317
SPREADING
Tool for releasing optical elements
[NASA-CASE-GSC-12794-1] N83-12434
STABILITY
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability
[AD-A118653] N83-12993
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak
[IPPJ-609] N83-12996
STACKS
Cell module and fuel conditioner development
[NASA-CR-165462-A] N83-12524
STAINLESS STEELS
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
STANDARDS
Metallographic standards for estimating hydrogen content of Zircaloy-4 tubing (LWBR development program)
[PB82-022074] N83-12225
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions
[AD-A118634] N83-12276
Material on the background integrated monitoring of natural environmental pollution --- in the U.S.S.R. N83-12609
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627
Verification tests of the Lectra Motors Corporation Lectra 2+2
[AD-A118718] N83-13040
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051
STANDING WAVES
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth
[AD-A118597] N83-12942
STATIC AERODYNAMIC CHARACTERISTICS
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter N83-12535
STATIC DISCHARGERS
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
STATIC ELECTRICITY
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
STATIC LOADS
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
STATIC TESTS
Static testing to evaluate airtanker delivery performance --- distribution of flame retardants in forest fires
[PB82-179946] N83-12079
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
STATISTICAL ANALYSIS
Statistical and synoptic evaluations of TIROS-N and NOAA-6 retrievals
[PB82-188053] N83-12826
Models and estimation procedures for the analysis of subjects-by-items data arrays
[AD-A118730] N83-12856
Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison
[DE81-701030] N83-12962
STATISTICAL DISTRIBUTIONS
Selection of distribution types for extremes of precipitation
[WMO-560] N83-12797
A two-stage elimination type procedure for selecting the largest of several normal means with a common unknown variance
[AD-A118501] N83-12943
On a generalization of the matric-t distribution
[TR-71] N83-12955
STATISTICAL WEATHER FORECASTING
Possibility of determining drought probability and using it in decision making N83-12738
Climatic probabilities of the vertical distribution of cloud cover
[AD-A118753] N83-12778
The B-G system of evaluating forecasts
[AD-A118735] N83-12782
Selection of distribution types for extremes of precipitation
[WMO-560] N83-12797
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821
STATISTICS
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821
STEADY FLOW
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375
The computation of transonic potential flow N83-12379
STEADY STATE
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement of metal temperature heat flux and strain N83-12264
Stewartson's triple deck
[AD-A118617] N83-12381
STEAM FLOW
Critical conditions and the choking mass flowrate in non-equilibrium wet steam flows
[CUED/A-TURBO/TR-113] N83-12349
Non-equilibrium throughflow analyses of low pressure, wet steam turbines
[CUED/A-TURBO/TR-116] N83-12350
STEAM TURBINES
Non-equilibrium throughflow analyses of low pressure, wet steam turbines
[CUED/A-TURBO/TR-116] N83-12350
STEEL STRUCTURES
Field tests of a continuous twin girder steel bridge
[PB82-185901] N83-12477
STELLAR ENVELOPES
High sensitivity molecular line observations of IRC+10216
[PB82-187220] N83-13044
STELLAR MASS EJECTION
Solar-Geophysical Data. Part 2: Comprehensive Reports. Number 448: Data for June 1981 and miscellanea
[PB82-184748] N83-13056
STELLAR SPECTRA
High sensitivity molecular line observations of IRC+10216
[PB82-187220] N83-13044
STELLARATORS
Solve: A non linear least-squares code and its application to the optimal placement of torsatron vertical field coils
[DE82-015605] N83-12950
STEREOTELEVISION
Stereophonic and two channel sound in terrestrial television broadcasting
[BBC-RD-1982/18] N83-12292
STIFFNESS
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471
STIRLING CYCLE
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-169474] N83-12214
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332
Computer program for a four-cylinder-Stirling-engine controls simulation
[NASA-TM-82774] N83-12359
STORMS (METEOROLOGY)
Radar analysis for severe weather detection and tracking
[FAA-RD-82-64] N83-12719
STRAIN ENERGY METHODS
Surface instabilities on an equibiaxially stretched elastic half-space
[TR-7] N83-12447
STRAIN GAGES
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
STRAITS
Sources, composition and transport of suspended particulate matter in Lower Cook Inlet and Northwestern Shelikof Strait, Alaska
[PB82-193236] N83-12837
STREAMLINED BODIES
Recent improvements and enhancements to NASTRAN N83-12454
STREAMS
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791
STRESS (PHYSIOLOGY)
Pilot performance and stress: Search for a killer N83-12851
STRESS (PSYCHOLOGY)
Pilot performance and stress: Search for a killer N83-12851
Information load stress, risk taking and physiological responsivity in a visual-motor task
[AD-A118079] N83-12857
STRESS ANALYSIS
Fatigue and fracture research in metals N83-12158
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212
Integrated finite element thermal-structural analysis with radiation heat transfer
[NASA-TM-84469] N83-12356
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
A new capability for elastic aircraft airloads via NASTRAN N83-12464
Performance tests of full span form bridges
[PB82-183039] N83-12475
Field tests of a continuous twin girder steel bridge
[PB82-185901] N83-12477
Pilot performance and stress: Search for a killer N83-12851

STRESS CONCENTRATION
Experimental studies of the effect of scale on the stressing of metals
[ISSN-0208-5658] N83-12211
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473
STRESS CORROSION
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
STRESS MEASUREMENT
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
STRESS RELAXATION
Stress relaxation of cellular silicone material: 1982
[DE82-020115] N83-12243
STRESSES
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435
STRUCTURAL ANALYSIS
Durability of spacecraft materials N83-12165
Integrated finite element thermal-structural analysis with radiation heat transfer
[NASA-TM-84469] N83-12356
Virtual work, material inequalities and variational principles in structural mechanics
[TR-10] N83-12445
Materials constitutive models for nonlinear analysis of thermally cycled structures
[NASA-TP-2055] N83-12449
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462
The usage of substructuring analyses in the Get Away Special (GAS) program N83-12466
On restarts in NASTRAN N83-12469
Field tests of a continuous twin girder steel bridge
[PB82-185901] N83-12477
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
Shear in composite beam-to-column connections
[PB82-187246] N83-12479
A fast hidden line algorithm for plotting finite element models
[NASA-TM-83981] N83-12879
STRUCTURAL DESIGN
An evaluation of the inelastic behaviour of two degree of freedom structures under earthquake loading
[TR-9] N83-12258
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286
Passive solar energy in Washington: Results of the Washington passive solar design/build/competition
[DE82-020394] N83-12549
Design and fabrication of a prototype system for photovoltaic residences in the Southwest
[DE82-020783] N83-12554
Solar home show: Homes designed for the solar homebuilders program
[DE82-020255] N83-12557
Structural design considerations for a line-focus reflective module using inexpensive composite materials
[DE82-021611] N83-12587
STRUCTURAL DESIGN CRITERIA
Climatological aspects of building with special reference to wind related phenomena N83-12760
STRUCTURAL ENGINEERING
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286
STRUCTURAL PROPERTIES (GEOLOGY)
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705
STRUCTURAL STABILITY
Large displacements and stability analysis of nonlinear propeller structures N83-12460
STRUCTURAL STRAIN
Virtual work, material inequalities and variational principles in structural mechanics
[TR-10] N83-12445
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
STRUCTURES
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283
SUBMILLIMETER WAVES
Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
SUBROUTINES
A new capability for elastic aircraft airloads via NASTRAN N83-12464
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
SUBSONIC FLOW
Characteristics of high performance ejectors
[AD-A118720] N83-12095
SUBSTITUTES
Assessment of current and projected future trends in light-duty-vehicle fuel switching. Subtask 1
[DE82-018816] N83-12440
SUBSTRUCTURES
The usage of substructuring analyses in the Get Away Special (GAS) program N83-12466
SUCTION
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043
On higher eigenstates of Goertler instability in compressible flow
[NASA-CR-169480] N83-12355
SULFIDES
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016
SULFUR DIOXIDES
Application of thin film solid sorbents for estimation of SO2 background concentrations N83-12655
Mechanisms of dry SO2 control processes
[PB82-196924] N83-12668
Iowa air quality report, 1980
[PB82-189614] N83-12675
SUMMER
Characteristics of the tropospheric mean wind flow over Africa during northern winter season N83-12739
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
SUNFLOWERS
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
SUNLIGHT
Objective forecasting of the heights of precipitation and of relative insolation by means of discriminatory analysis
[REPT-44] N83-12716
SUNSPOTS
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
SUPERCONDUCTING POWER TRANSMISSION
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] N83-12344
SUPERCONDUCTORS
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] N83-12344
SUPERPLASTICITY
Fundamental investigations of superplastic forming processes
[AD-A118614] N83-12220
SUPERSONIC FLOW
Characteristics of high performance ejectors
[AD-A118720] N83-12095
High velocity measurements: Special requirements N83-12411
SURFACE ACOUSTIC WAVE DEVICES
A dual differential interferometer
[NASA-CASE-LAR-12966-1] N83-12969
SURFACE FINISHING
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
SURFACE PROPERTIES
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability
[AD-A118653] N83-12993
SURFACE ROUGHNESS
Development of computer models for the prediction of large distorted antenna characteristics
[NASA-CR-169479] N83-12304
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491
SURFACE TEMPERATURE
Data collection and analysis for geothermal research
[PB82-185430] N83-12390
Heat source: Materials interactions during fusion welding
[AD-A118776] N83-12436
SURFACE WATER
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519
Problems of background monitoring of surface waters --- in the U.S.S.R. N83-12626
SURFACE WAVES
Electromagnetic methods of nondestructive evaluation
[AD-A118587] N83-12443
SURFACES
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435
SURGES
Experimental investigation of transport of discrete solids with surge flows in a 10.0 cm diameter partially filled pipe
[PB82-178724] N83-12389
SURVEYS
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects. Volume 3. Utility load management project
[DE82-007247] N83-12559
Passive-solar test modules
[DE82-021841] N83-12578
SUSPENSION SYSTEMS (VEHICLES)
An experimental study of an ultra-mobile vehicle for off-road transportation
[AD-A118474] N83-13039
SWEPT FORWARD WINGS
Measurement of wake interactions of a canard and a forward swept wing
[AD-A118756] N83-12053
SWITCHES
Heat pipe thermal switch
[NASA-CASE-GSC-12812-1] N83-12525
SWITCHING CIRCUITS
The design of transitions in waveguides
[INPE-2369-PRE/409] N83-12328
SYMMETRICAL BODIES
Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467
SYNOPTIC METEOROLOGY
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
Synoptic-scale motions --- GARP Atlantic Tropical Experiment (GATE) N83-12728
Basic synoptic networks of observing stations
[WMO-217] N83-12800
On the determination of precipitation efficiency
[PB82-184938] N83-12820
Statistical and synoptic evaluations of TIROS-N and NOAA-6 retrievals
[PB82-188053] N83-12826
SYNTAX
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
Algorithms for program verification
[AD-A118570] N83-12894
SYNTHESIS (CHEMISTRY)
Polymer research at NASA Langley Research Center N83-12149
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208
Polymer science and engineering: Challenges, needs and opportunities N83-12238

SYNTHETIC APERTURE RADAR
SP mountain data analysis
[NASA-CR-169471] N83-12303
Computer modeling of a wideswath SAR concept employing multiple antenna beam formation techniques
[NASA-CR-167757] N83-12305
System calibration strategies for spaceborne synthetic aperture radar
[PB82-182502] N83-12326
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713
SYNTHETIC FUELS
Soot formation in synfuels
[DE82-004271] N83-12199
SYSTEMS ANALYSIS
Performance comparison for Barnes model 12-1000, Exotech model 100, and Ideas Inc. Biometer Mark 2
[E83-10004] N83-12484
Sneak analysis application guidelines
[AD-A118479] N83-12887
An algorithm for reducing acyclic hypergraphs
[AD-A118535] N83-12936
Diagnostic problems with technical systems
[ISSN-0208-5658] N83-12964
Computerised book procurement system: System analysis
[PB82-188947] N83-13036
SYSTEMS ENGINEERING
Pointing payload for single tether balloons
[AD-A118770] N83-12054
Modular small hydro configuration
[PB82-184953] N83-12327
Systems engineering: A project planning and control methodology
[INPE-2496-PRE/179] N83-12965
SYSTEMS MANAGEMENT
Operation plan for the data 100/LARS terminal system
[E83-10011] N83-12490
SYSTEMS SIMULATION
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589

T

T SHAPE
Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474
TABLES (DATA)
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Wurtsmith AFB, Mich., Parts A-F
[AD-A118510] N83-12780
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787
Project Skywater data inventory: 1980 - 1981 SCPP season, Sierra Cooperative Pilot Project
[PB82-185174] N83-12819
TACKINESS
PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175
TANTALUM
Conservation of strategic metals N83-12154
TANZANIA
Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750
Climatic effects on soil erosion in Zanzibar --- rainfall effects N83-12752
TARGET ACQUISITION
A modified Newton method for multilateration and its application to the RMS/MTTS system
[AD-A118728] N83-12122
TARGET RECOGNITION
Radar waveform synthesis for target identification
[AD-A118572] N83-12316
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858
TARGETS
F-106 tow system (IOT&E)
[AD-A118527] N83-12074
Hybrid tracking algorithm improvements and cluster analysis methods
[AD-A118470] N83-12944
TASK COMPLEXITY
The relationship between effort rating and performance in a critical tracking task
[FAA-EM-81-13] N83-12853
TASKS
Reduction of voluntary dehydration during effort in hot environments
[NASA-TM-76956] N83-12849
TECHNOLOGY ASSESSMENT
Evaluation of technology assessments and development of evaluation protocols, project report
[PB82-197393] N83-13027
Evaluation of technology assessments and development of evaluation protocols
[PB82-197385] N83-13028
TECHNOLOGY UTILIZATION
An appraisal of the programme --- Indian space program N83-12116
International issues N83-12118
TECTONICS
A model for tectonic strain release from explosions in complex prestress fields applied to anomalous seismic waves from NTS and eastern Kazakh explosions
[AD-A118503] N83-12697
Fracture analysis of crystalline rocks: Field measurements and field geomechanical techniques
[PB82-176678] N83-12712
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713
TELECOMMUNICATION
Applications of space science and technology --- Indian space program N83-12115
TELEGRAPH SYSTEMS
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296
TELEMETRY
Signal transmission via sliprings and telemetry N83-12267
The DE magnetometer preprocessor users guide
[NASA-TM-83999] N83-12882
TELEPHONY
Compression/depression of images from meteorological satellites for transmission by telephone
[INPE-2373-NTE/183] N83-12294
TELEPRINTERS
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296
TELEVISION EQUIPMENT
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308
TELEVISION RECEIVERS
Television receiver, 4 GHz
[INPE-2478-PRE/164] N83-12301
TELEVISION SYSTEMS
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308
TELEVISION TRANSMISSION
Television receiver, 4 GHz
[INPE-2478-PRE/164] N83-12301
TELLURIC LINES
Latitudinal variation of telluric and atmospheric gamma-ray radiation
[INPE-2538-PRE/201] N83-12689
TEMPERATURE DEPENDENCE
A model of the thermal-spike mechanism in graphite/epoxy laminates
[NASA-TM-84299] N83-12173
TEMPERATURE DISTRIBUTION
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
TEMPERATURE EFFECTS
A model of the thermal-spike mechanism in graphite/epoxy laminates
[NASA-TM-84299] N83-12173
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat
[NASA-TM-76955] N83-12848
TEMPERATURE GRADIENTS
Baroclinic analysis of the Southern Hemisphere
[INPE-2541-PRE/203] N83-12683
TEMPERATURE INVERSIONS
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
TEMPERATURE MEASUREMENT
Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247
Measurement of metal temperature heat flux and strain N83-12264
Measurement techniques for heat transfer in the turbine using short duration wind tunnel techniques N83-12271
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511
TEMPERATURE PROFILES
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045
TEMPORAL DISTRIBUTION
National ambient noise survey
[PB82-193681] N83-12671
TENNESSEE VALLEY (AL-KY-TN)
Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] N83-12706
TENSILE STRESS
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
TENSILE TESTS
Method and apparatus for gripping uniaxial fibrous composite materials --- holding specimens for mechanical property testing
[NASA-CASE-LEW-13758-1] N83-12176
TERMINAL FACILITIES
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
TERNARY ALLOYS
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224
TERRAIN
An experimental study of an ultra-mobile vehicle for off-road transportation
[AD-A118474] N83-13039
TERRAIN ANALYSIS
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858
Software for three dimensional topographic sciences
[AD-A118465] N83-12898
TEST FACILITIES
Development of electrical test procedures for qualification of spacecraft against EID. Volume 2: Review and specification of test procedures
[NASA-CR-165590] N83-12137
Passive-solar test modules
[DE82-021841] N83-12578
TETHERED BALLOONS
Pointing payload for single tether balloons
[AD-A118770] N83-12054
TEXTURES
Industrial ion source technology
[NASA-CR-159877] N83-12259
Development of an image segmentation algorithm called MITES
[AD-A118577] N83-12897
THEMATIC MAPPING
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508
THEOREMS
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
THERMAL CONDUCTIVITY
Determination of conductive thermal resistance of plates with nonuniform internal heat generation and under various boundary conditions
[INPE-2512-PRE/191] N83-12351
THERMAL CONTROL COATINGS
Turbine engine materials durability research N83-12163
THERMAL DECOMPOSITION
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256
THERMAL ENERGY
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
Solar thermal industry status and future needs
[DE82-020885] N83-12546

THERMAL EXPANSION
Processing composite materials N83-12153
THERMAL FATIGUE
High-temperature fatigue in metals N83-12159
THERMAL PROTECTION
Recent advances in carbon-carbon materials systems N83-12162
THERMAL RADIATION
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive [PB82-185315] N83-12821
THERMAL RESISTANCE
Determination of conductive thermal resistance of plates with nonuniform internal heat generation and under various boundary conditions [INPE-2512-PRE/191] N83-12351
THERMAL STABILITY
Metal phthalocyanine polymers [NASA-CASE-ARC-11405-1] N83-12239
Performance comparison for Barnes model 12-1000, Exotech model 100, and Ideas Inc. Biometer Mark 2 [E83-10004] N83-12484
Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] N83-12997
THERMAL STRESSES
Integrated finite element thermal-structural analysis with radiation heat transfer [NASA-TM-84469] N83-12356
THERMOCHEMICAL PROPERTIES
Application of thermochemical modeling to aircraft interior polymeric materials [NASA-CR-169364] N83-12237
THERMOCOUPLES
Signal transmission via sliprings and telemetry N83-12267
THERMODYNAMIC EFFICIENCY
Characteristics of high performance ejectors [AD-A118720] N83-12095
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine [NASA-CR-167917] N83-12250
THERMODYNAMIC PROPERTIES
Thermodynamic data for desulfurization processes [PB82-184904] N83-12207
Measurement Techniques in Turbomachines [VKI-LS-1981-7] N83-12260
RADC thermal guide for reliability engineers [AD-A118839] N83-12338
Heat pipe thermal switch [NASA-CASE-GSC-12812-1] N83-12525
Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] N83-12997
THERMODYNAMICS
An analysis of thermal response factors and how to reduce their computational time requirement [NASA-CR-165992] N83-12523
THERMOHYDRAULICS
Mathematical methods in nuclear-reactor thermal hydraulics N83-12369
THERMOMETERS
Development of an airborne sonic thermometer [AD-A118774] N83-12400
THERMOPLASTIC RESINS
Polymer research at NASA Langley Research Center N83-12149
THERMOSETTING RESINS
Polymer research at NASA Langley Research Center N83-12149
THETA PINCH
Analysis of stabilization effect of quadrupole field on theta pinch plasmas [IPPJ-608] N83-12995
THICKNESS
Feasibility of acoustically determining the thickness of sea ice [AD-A118499] N83-12830
THIN AIRFOILS
Unsteady boundary layer due to an oscillating free stream vs. an oscillating model [AD-A118591] N83-12383
THIN FILMS
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
A nonintrusive laser interferometer method for measurement of skin friction [NASA-TM-84300] N83-12393
Single crystal epitaxy and characterization of beta-SiC [AD-A118800] N83-13018
THIN PLATES
Stress analysis of adhesively bonded repairs to fibre composite structures [ARL-STRUC-REPORT-386] N83-12172
Determination of conductive thermal resistance of plates with nonuniform internal heat generation and under various boundary conditions [INPE-2512-PRE/191] N83-12351
THREE DIMENSIONAL BOUNDARY LAYER
Notes on coordinate generation: Fundamental ideas N83-12376
THREE DIMENSIONAL FLOW
Three dimensional flow computations in a turbine scroll [NASA-CR-168003] N83-12045
Calculation of compressible flow in and about three-dimensional inlets with and without auxiliary inlets by a higher-order panel method [NASA-CR-168009] N83-12047
The CMC:3DPNS computer program for prediction of three-dimensional, subsonic, turbulent aerodynamic juncture region flow. Volume 1: Theoretical [NASA-CR-3645] N83-12352
The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371
Computational Fluid Dynamics [VKI-LS-1981-5] N83-12372
Numerical methods for two- and three-dimensional viscous flows N83-12378
A nonintrusive laser interferometer method for measurement of skin friction [NASA-TM-84300] N83-12393
THRUST AUGMENTATION
Characteristics of high performance ejectors [AD-A118720] N83-12095
TILES
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel [NASA-TM-84529] N83-12133
TIME
A regressive model of isochronism in speech units [ISSN-0208-5658] N83-12291
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting [NASA-TM-81374] N83-12881
TIME DEPENDENCE
Computational methods in Tokamak transport [DE82-016616] N83-13006
TIME DIVISION MULTIPLE ACCESS
Next generation communications satellites: multiple access and network studies [NASA-CR-167903] N83-12129
TIME SERIES ANALYSIS
A study of meteorological time series. Part 2: Applications of autoregressive models [INPE-2519-PRE/194-PT-2] N83-12717
TIN OXIDES
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1 [DE82-020117] N83-12428
TIROS N SATELLITE
Statistical and synoptic evaluations of TIROS-N and NOAA-6 retrievals [PB82-188053] N83-12826
TIROS N SERIES SATELLITES
Modified version of the TIROS N/NOAA A-G satellite series (NOAA E-J) advanced TIROS N (ATN) [PB82-194044] N83-12131
TITANIUM
Colorimetric oil analysis for titanium [AD-A118445] N83-12190
TITANIUM ALLOYS
Shape-memory resistivity behavior of transformation-fatigue-cycled nickel-titanium wires near the equiatomic composition [DE82-018272] N83-12226
Production of titanium alloy powders N83-12229
TOKAMAK DEVICES
Radiation damage in diagnostic window materials for the TFTR [ANL-FFP-TM-146] N83-12987
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak [IPPJ-609] N83-12996
Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] N83-12997
Computational methods in Tokamak transport [DE82-016616] N83-13006
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks [DE82-013674] N83-13007
TOOLS
Tool for releasing optical elements [NASA-CASE-GSC-12794-1] N83-12434
TOPOGRAPHY
Site characteristics for wind energy conversion devices N83-12528
Software for three dimensional topographic sciences [AD-A118465] N83-12898
A data reduction package for US Army Topographic computers: Hand-held programmable calculators [AD-A118854] N83-12902
TORQUE
Strain gage load measurement on the shuttle orbiter [NASA-TM-84898] N83-12135
TORSION
Finite element solution of torsion and other 2-D Poisson equations N83-12463
TOWED BODIES
F-106 tow system (IOT&E) [AD-A118527] N83-12074
TOWERS
Wakes produced by single-element and multiple-element wind turbine towers N83-12533
TOWNSEND DISCHARGE
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case [DE82-020362] N83-12947
TOXICITY
Test methods for evaluating solid waste: Physical/chemical methods [PB82-172156] N83-12210
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations [DE82-002758] N83-12560
TRACE CONTAMINANTS
Chemical and isotope analysis of trace pollutants in different environmental media N83-12612
Comments on the specifications of network stations for monitoring the variability of atmospheric trace constituents significant for climate N83-12619
TRACKING (POSITION)
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept [AD-A118768] N83-12076
Lateral flying qualities of highly augmented fighter aircraft, volume 2 [AD-A118071] N83-12100
Hybrid tracking algorithm improvements and cluster analysis methods [AD-A118470] N83-12944
TRAINING ANALYSIS
Research Issues in the Determination of Simulator Fidelity: Proceedings of the ARI sponsored Workshop [AD-A118253] N83-12106
Pilot judgment training and evaluation, volume 1 [AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3 [AD-A117508] N83-12855
Map interpretation for low altitude flight: Evaluation of a prototype course [AD-A118391] N83-12858
TRAINING EVALUATION
Definition of Alaskan Aviation training requirements N83-12852
Pilot judgment training and evaluation, volume 1 [AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3 [AD-A117508] N83-12855
TRANSDUCERS
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
TRANSFER FUNCTIONS
An active filter capable of realizing any stable transfer function [INPE-2554-RPE/418] N83-12331
TRANSFER ORBITS
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary [NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical [NASA-CR-167889] N83-12145
TRANSFORMATIONS (MATHEMATICS)
Evaluation and reduction of errors induced by the Guyan transformation N83-12468
TRANSIENT LOADS
Response of thick cylindrical shells to transient internal loadings [AD-A118600] N83-12472
TRANSITION METALS
Carbide-binder phases in cemented carbides N83-12233
New laser dye systems based on transition metal complexes [AD-A118699] N83-12426
Magnetic phase transitions and ground state properties of magnetic crystals [AD-A118842] N83-13011
TRANSITION PROBABILITIES
Theoretical study of state-to-state collisions [AD-A118586] N83-12979

TRANSMISSION LINES
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] N83-12344
TRANSMITTERS
Data transmitters and command receiver development
[AD-A118739] N83-12322
TRANSONIC FLOW
Unsteady transonic flow in a two-dimensional diffuser
[AD-A118473] N83-12052
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375
The computation of transonic potential flow N83-12379
TRANSONIC WIND TUNNELS
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043
Extraction of model performance from wall data in a 2-dimensional transonic flexible walled test section
[NASA-CR-165994] N83-12102
The 1981 calibration of the AEDC-PWT aerodynamic wind tunnel (4T) at Mach numbers from 0.1 to 1.3
[AD-A118704] N83-12104
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel
[NASA-TM-84529] N83-12133
Flow visualiztion in a cryogenic wind tunnel using holography
[NASA-TM-84556] N83-12395
TRANSPORT AIRCRAFT
Aerodynamics on a transport aircraft type wing-body mode
[PB82-206855] N83-12081
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094
Opportunities for composites in commercial transport structures N83-12148
Polymer materials research at NASA Ames Research Center N83-12150
Durability of aircraft composite materials N83-12164
Impact of advanced air transport technology. Part 2: The air cargo system, background paper
[PB82-186818] N83-12919
Impact of advanced transport technology. Part 3: Air service to small communities
[PB82-186800] N83-12920
TRANSPORT PROPERTIES
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256
Turbulence modelling and boundary layer calculation methods N83-12364
TRANSPORT THEORY
Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002
Computational methods in Tokamak transport
[DE82-016616] N83-13006
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007
TRAVELING WAVE TUBES
Design concepts for a high-impedance narrow-band 42 GHz power TWT using a fundamental/forward ladder-based circuit
[NASA-CR-165282] N83-12330
TRIBOLOGY
Tribology N83-12167
Elastohydrodynamic lubrication theory
[NASA-TM-81695] N83-12432
TRIBUTARIES
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
TRITIUM
Comments on thermal runaway experiments in sub-ignition Tokamaks
[IPPJ-610] N83-12997
TROMBE WALLS
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
TROPICAL METEOROLOGY
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
Major tasks of GATE N83-12725
GATE observational strategy: A look in retrospect N83-12726
Large-scale mean state N83-12727
Theoretical studies of tropical waves --- GARP Atlantic Tropical Experiment (GATE) N83-12729
Large-scale numerical modelling --- GARP Atlantic Tropical Experiment (GATE) N83-12730
Physics of the upper tropical ocean --- GARP Atlantic Tropical Experiment (GATE) N83-12731
Technical Conference on Climate: Africa
[WMO-596] N83-12736
Numerical modeling of tropical weather systems
[AD-A118836] N83-12784
First planning meeting for the typhoon operational experiment (TOPEX) --- Tokyo, 17-26 Jun. 1980
[WMO-565] N83-12789
World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report
[GARP-FOR-8] N83-12796
Focusing mechanisms in the Texas flash floods of 1978
[PB82-185380] N83-12822
Harmonic analysis of normal pentad rainfall of Indian Stations
[PB82-186875] N83-12824
TROPICAL REGIONS
Numerical modeling of tropical weather systems
[AD-A118836] N83-12784
TROPOSPHERE
Tropospheric chemistry and air pollution
[WMO-583] N83-12663
Characteristics of the tropospheric mean wind flow over Africa during northern winter season N83-12739
TROUGHS
Structural design considerations for a line-focus reflective module using inexpensive composite materials
[DE82-021611] N83-12587
TURBINE BLADES
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
Blade pressure measurements N83-12275
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360
Horizontal and vertical axis wind turbines N83-12529
TURBINE ENGINES
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094
Turbine engine materials durability research N83-12163
TURBINE PUMPS
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140
Modular small hydro configuration
[PB82-184953] N83-12327
TURBINES
Three dimensional flow computations in a turbine scroll
[NASA-CR-168003] N83-12045
Advanced technologies for turbomachinery systems: An overview
[NASA-TM-82949] N83-12090
TURBOCOMPRESSORS
The WISGSK: A computer code for the prediction of a multistage axial compressor performance with water ingestion
[NASA-CR-3624] N83-12093
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
TURBOFAN ENGINES
A remote augmentor lift system with a turbine bypass engine
[NASA-TM-82932] N83-12087
Correlation of core noise obtained by three signal coherence techniques
[NASA-TM-83012] N83-12966
TURBOGENERATORS
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971
TURBOMACHINERY
Advanced technologies for turbomachinery systems: An overview
[NASA-TM-82949] N83-12090
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement of non-steady fluid dynamic quantities N83-12262
Problems of measurement of dynamic wall pressures N83-12263
Measurement of metal temperature heat flux and strain N83-12264
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
Signal transmission via sliprings and telemetry N83-12267
Introduction to laser anemometry studies in turbomachinery N83-12268
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363
Turbulence modelling and boundary layer calculation methods N83-12364
Further developments in laser anemometry N83-12423
TURBOPROP ENGINES
Efficiency improved turboprop
[AD-A118819] N83-12096
TURBULENCE
Turbulent solution of the Navier-Stokes equations for an inhomogenous developing shear layer
[NASA-TM-82969] N83-12357
Sonde experiments for comparative measurements of optical turbulence
[AD-A118740] N83-12699
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968
Anisotropy in MHD turbulence due to a mean magnetic field
[NASA-TM-84000] N83-12998
TURBULENCE METERS
Design and experimental study of low noise hot-wire anemometer with constant current mode
[NAL-TR-697] N83-12391
TURBULENT BOUNDARY LAYER
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Turbulence modelling and boundary layer calculation methods N83-12364
TURBULENT DIFFUSION
Eddy diffusion coefficients in the lower thermosphere --- turbulent diffusion
[INPE-2502-PRE/183] N83-12680
TURBULENT FLOW
The CMC:3DPNS computer program for prediction of three-dimensional, subsonic, turbulent aerodynamic juncture region flow. Volume 1: Theoretical
[NASA-CR-3645] N83-12352
Computational Fluid Dynamics
[VKI-LS-1981-5] N83-12372
Higher level simulations of turbulent flows
[SU-TF-16] N83-12373
Applications of Rayleigh scattering to turbulent flows with heat transfer and combustion
[AD-A118576] N83-12385
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
TURBULENT JETS
The spreading rate of nonhomogeneous turbulent jets
[NAL-TR-701] N83-12347
TURBULENT WAKES
Measurement of non-steady fluid dynamic quantities N83-12262
Wakes produced by single-element and multiple-element wind turbine towers N83-12533
TWO DIMENSIONAL BODIES
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
TWO DIMENSIONAL BOUNDARY LAYER
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363
TWO DIMENSIONAL FLOW
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050

Unsteady transonic flow in a two-dimensional diffuser
[AD-A118473] N83-12052
Extraction of model performance from wall data in a 2-dimensional transonic flexible walled test section
[NASA-CR-165994] N83-12102
Computational Fluid Dynamics
[VKI-LS-1981-5] N83-12372
Numerical methods for two- and three-dimensional viscous flows N83-12378
Stewartson's triple deck
[AD-A118617] N83-12381
A nonintrusive laser interferometer method for measurement of skin friction
[NASA-TM-84300] N83-12393

TWO PHASE FLOW
One-dimensional unsteady two-phase flows with interphase slip: A numerical study N83-12368
Studies of particle motion by laser Doppler techniques N83-12414
Heat and mass transfer in turbulent, particulate two phase flows N83-12417
Measurements in particulate two phaseflows N83-12424

TYPHOONS
First planning meeting for the typhoon operational experiment (TOPEX) --- Tokyo, 17-26 Jun. 1980
[WMO-565] N83-12789
World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795

U

U.S.S.R.
Problems of air pollution monitoring --- in the U.S.S.R. N83-12607
Material on the background integrated monitoring of natural environmental pollution --- in the U.S.S.R. N83-12609
Hydrochemical observations at Lake Baikal. Present conditions --- pollution monitoring N83-12616
On the USSR national system of observations and assessment of long range transport of air pollutants N83-12618
Study of pollutant migration and transformation --- environmental monitoring in the U.S.S.R. N83-12623
Organochlorine pesticides in organisms of wild animals of terrestrial ecosystems --- in the U.S.S.R. N83-12636
Cycles of heavy metal migration in ecosystems of the Sikhote-Alin biospheric region N83-12641
Research on the chemical composition of precipitation at background stations --- in the U.S.S.R. N83-12647
Methods for background monitoring of pollutants in natural media --- used in the U.S.S.R. N83-12649
Instruments and methods for monitoring background soil pollution --- in the U.S.S.R. N83-12650

U.S.S.R. SPACE PROGRAM
The future of high energy gamma ray astronomy and its potential astrophysical implications
[NASA-TM-83986] N83-13042

UH-60A HELICOPTER
Operational noise data for UH-60A and CH-47C Army helicopter
[AD-A118796] N83-12974

ULTRAHIGH FREQUENCIES
Pointing performance of the 8300 series Datron antennas
[AD-A118660] N83-12311

ULTRASONIC RADIATION
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970

ULTRASONIC WAVE TRANSDUCERS
Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397

ULTRASONICS
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
Advances in nondestructive evaluation technology N83-12169

ULTRAVIOLET ASTRONOMY
A telescope for ultraviolet photometry
[INPE-2439-PRE/140] N83-12990

ULTRAVIOLET LASERS
Attempts at ultraviolet laser initiation of nitromethane and PETN
[DE82-021253] N83-12430

ULTRAVIOLET PHOTOGRAPHY
Planet-A, Japanese first interplanetary flight, second edition
[SFS-TD-82-014] N83-12110

ULTRAVIOLET RADIATION
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057

ULTRAVIOLET TELESCOPES
A telescope for ultraviolet photometry
[INPE-2439-PRE/140] N83-12990

UNDERGROUND EXPLOSIONS
A model for tectonic strain release from explosions in complex prestress fields applied to anomalous seismic waves from NTS and eastern Kazakh explosions
[AD-A118503] N83-12697

UNDERGROUND STORAGE
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705

UNDERGROUND STRUCTURES
Earth-covered buildings: An exploratory analysis for hazard and energy performance
[PB82-189564] N83-12285

UNDERWATER ACOUSTICS
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835

UNITED NATIONS
International co-operation and the role of the United Nations N83-12119

UNITED STATES OF AMERICA
Man in space
[PB82-186784] N83-13023

UNIVAC COMPUTERS
Sperry Univac OS.3 COBOL version 07.00/58
[PB82-184920] N83-12911

UNIVERSITIES
Compendium of training facilities for meteorology and operational hydrology
[WMO-240-REV] N83-12810

UNSTEADY FLOW
Unsteady transonic flow in a two-dimensional diffuser
[AD-A118473] N83-12052
Measurement of non-steady fluid dynamic quantities N83-12262
Unsteady boundary layer due to an oscillating free stream vs. an oscillating model
[AD-A118591] N83-12383
Noise source mechanisms in unsteady flow
[PB82-203837] N83-12976

UPPER ATMOSPHERE
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions
[PB82-198771] N83-12711
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808

UPPER VOLTA
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751

URANIUM
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512

URANIUM ALLOYS
Diffusional transformations, strengthening mechanisms, and mechanical properties of uranium alloys
[DE82-020051] N83-12222

URBAN PLANNING
Biological processes in the treatment of municipal water supplies
[PB82-199704] N83-12664
Some climatological aspects of the development of drainage systems in urban areas N83-12763

URINE
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat
[NASA-TM-76955] N83-12848

USER MANUALS (COMPUTER PROGRAMS)
Recent improvements and enhancements to NASTRAN N83-12454
Users manual for WIND N83-12534
ROSET: A solar-thermal electric-power simulation users guide
[DE82-021997] N83-12567
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview
[E83-10007] N83-12866
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting
[NASA-TM-81374] N83-12881
The DE magnetometer preprocessor users guide
[NASA-TM-83999] N83-12882
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12888
On-Line Pattern Analysis and Recognition System, OLPARS 6. Programmer and system maintenance manual
[AD-A118731] N83-12899
On-line Pattern Analysis and Recognition System, OLPARS 6. Software reference manual
[AD-A118732] N83-12900
On-Line Pattern Analysis and Recognition System, OLPARS 6. Users manual
[AD-A118733] N83-12901
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906

USER REQUIREMENTS
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design
[AD-A118822] N83-12870
Traditional computing center as a modern network node
[DE82-006935] N83-12914

UTILITIES
ROSET: A solar-thermal electric-power simulation users guide
[DE82-021997] N83-12567

V

V/STOL AIRCRAFT
Research and development of lift-jet engine, 1 --- v/stol aircraft
[NAL-TR-699] N83-12084

VACUUM DEPOSITION
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281

VALENCE
Test methods for evaluating solid waste: Physical/chemical methods
[PB82-172156] N83-12210

VAPOR DEPOSITION
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018

VAPOR PHASE EPITAXY
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018

VAPOR PHASES
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

VARIABILITY
Studies of large-scale thermal variability with a synoptic mixed layer model
[AD-A118159] N83-12833

VARIATIONS
Possible changes in sea level and their causes
[DE82-013848] N83-12636
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057

VEGETATION
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility
[NASA-TM-83969] N83-12396
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project
[E83-10024] N83-12507

VELOCITY
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970

VELOCITY DISTRIBUTION
System calibration strategies for spaceborne synthetic aperture radar
[PB82-182502] N83-12326
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
VELOCITY MEASUREMENT
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Introduction to laser anemometry studies in turbomachinery N83-12268
Introduction to LDA signal analysis and signal processing N83-12418
Signal processing by counters and digital processing of LDA signals N83-12419
Measurements in gas flows and flames N83-12420
Particle behaviour in flows and suitable particles for LDA measurements N83-12422
Further developments in laser anemometry N83-12423
Measurements in particulate two phaseflows N83-12424
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049
VERTICAL DISTRIBUTION
Climatic probabilities of the vertical distribution of cloud cover
[AD-A118753] N83-12778
VERTICAL LANDING
A visual technology research simulator for Vertical Take Off and Landing (VTOL)
[AD-A115626] N83-12103
VERTICAL ORIENTATION
Horizontal and vertical axis wind turbines N83-12529
VERTICAL TAKEOFF AIRCRAFT
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085
A remote augmentor lift system with a turbine bypass engine
[NASA-TM-82932] N83-12087
A visual technology research simulator for Vertical Take Off and Landing (VTOL)
[AD-A115626] N83-12103
VERY HIGH FREQUENCIES
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation
[BBC-RD-1982/17] N83-12293
VERY LOW FREQUENCIES
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321
VIBRATION
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
VIBRATION DAMPING
Application of Zimmerman flutter-margin criterion to a wind tunnel model
[NASA-TM-84545] N83-12070
VIBRATION ISOLATORS
Analysis of the properties of vibroisolating material described using the reological model
[ISSN-0208-5658] N83-12236
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-12398
VIBRATIONAL SPECTRA
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186
Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations
[AD-A118707] N83-12195
VINYL RADICAL
Singlet-oxygenation of a conjugated diallene: Attempt to prepare a stable divinyl peroxide
[AD-A118772] N83-12192
VIRTUAL PROPERTIES
Virtual work, material inequalities and variational principles in structural mechanics
[TR-10] N83-12445
VISCOELASTICITY
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448
VISCOSITY
Some properties of viscosity solutions of Hamilton-Jacobi equations
[AD-A118607] N83-12938
VISCOUS FLOW
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
Numerical methods for two- and three-dimensional viscous flows N83-12378
Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930
VISIBILITY
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118461] N83-12767
Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F
[AD-A118509] N83-12770
Seattle Tacoma IAP, Washington. Revised Unifrom Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118508] N83-12771
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118505] N83-12774
VISION
Vision research for flight simulation
[AD-A118721] N83-12860
VISUAL AIDS
A visual technology research simulator for Vertical Take Off and Landing (VTOL)
[AD-A115626] N83-12103
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS)
[DE82-017394] N83-12788
Vision research for flight simulation
[AD-A118721] N83-12860
VISUAL DISCRIMINATION
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057
VOICE COMMUNICATION
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
VOIDS
Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283
VOLATILITY
A study of volatility, content dynamics and transformation of priority pollutants in atmospheric and aquatic environments --- herbicides N83-12643
VOLCANOES
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
VOLTAGE AMPLIFIERS
Manufacturing methods and techniques for miniature high voltage hybrid multiplier modules
[AD-A118783] N83-12337
VOLTMETERS
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198
VORTEX GENERATORS
On higher eigenstates of Goertler instability in compressible flow
[NASA-CR-169480] N83-12355
VORTICES
On higher eigenstates of Goertler instability in compressible flow
[NASA-CR-169480] N83-12355
Higher level simulations of turbulent flows
[SU-TF-16] N83-12373
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972

W

WALKING MACHINES
An experimental study of an ultra-mobile vehicle for off-road transportation
[AD-A118474] N83-13039
WALL FLOW
Extraction of model performance from wall data in a 2-dimensional transonic flexible walled test section
[NASA-CR-165994] N83-12102
WALL PRESSURE
Problems of measurement of dynamic wall pressures N83-12263
WALL TEMPERATURE
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360
WASTE DISPOSAL
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
WASTE UTILIZATION
Questions and answers about energy recovery from waste
[DE82-022154] N83-12580
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
WASTE WATER
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670
WATER BALANCE
The importance of climate change on the water balance of Lake Malawi N83-12757
WATER FLOW
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
WATER HEATING
Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] N83-12287
Stevens Home, Rancho Santa Fe, California: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021698] N83-12538
Kalin Home, Long Island, New York: Solar-energy-system performance evaluation, Sep. 1981-Mar. 1982
[DE82-021701] N83-12539
EROS Data Center, Sioux Falls, South Dakota: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021703] N83-12540
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
WATER MANAGEMENT
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791
WATER POLLUTION
Monitoring of world ocean pollution N83-12614
Progress in the study of contamination effects in the marine environment --- effects on marine organisms N83-12615

Hydrochemical observations at Lake Baikal. Present conditions --- pollution monitoring N83-12616
Integrated global monitoring of the environment: Practical considerations N83-12617
Use of river basin water quality monitoring data to analyze heavy metal input to the marine environment N83-12625
Problems of background monitoring of surface waters --- in the U.S.S.R. N83-12626
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630
Study of pollutant impact on freshwater ecosystems N83-12639
Hydrological aspects of water quality monitoring under the conditions of anthropogenic impact N83-12654

WATER QUALITY
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519
Use of river basin water quality monitoring data to analyze heavy metal input to the marine environment N83-12625

WATER RESOURCES
Concepts and techniques in hydrological network design
[WMO-580] N83-12515
Application of climate data and information in the management of water resources --- in Africa N83-12755
Aridity in east Africa: Climatic geomorphology of water resources N83-12756
Regional Association 4 (North and Central America). Abridged report of the eighth session --- conference, Havana, 23 Nov. - 2 Dec. 1981
[WMO-586] N83-12805
Meteorological and hydrological aspects of siting and operation of nuclear power plants. Volume 2: Hydrological aspects
[WMO-550-VOL-2] N83-12989

WATER RUNOFF
Long-range water supply forecasting
[WMO-587] N83-12516
Hydrological aspects of water quality monitoring under the conditions of anthropogenic impact N83-12654

WATER TREATMENT
Biological processes in the treatment of municipal water supplies
[PB82-199704] N83-12664

WATER VAPOR
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183
Measurement of the combined heat and water-vapour flow through clothing under transient conditions
[AD-A118804] N83-12382
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659

WATER WAVES
Wave spectral transformation in shallow water
[AD-A118496] N83-12831
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth
[AD-A118597] N83-12942

WAVE DIFFRACTION
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297

WAVE EQUATIONS
Lower bounds for the life span of solutions of nonlinear wave equations in three dimensions
[AD-A118599] N83-12939

WAVE PROPAGATION
Response of thick cylindrical shells to transient internal loadings
[AD-A118600] N83-12472
Oceanographic applications of the Kalman filter
[NASA-TM-83993] N83-12829
A dual differential interferometer
[NASA-CASE-LAR-12966-1] N83-12969
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970
Solar tide in the atmospheric sodium layer
[INPE-2449-PRE/147] N83-13046

WAVE SCATTERING
High frequency scattering from arbitrarily oriented dielectric disks
[NASA-TM-83910] N83-12306

WAVEFORMS
Radar waveform synthesis for target identification
[AD-A118572] N83-12316

WAVEGUIDE WINDOWS
Digital image interpolators by window methods
[INPE-2498-PRE/181] N83-12929

WAVEGUIDES
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063
The design of transitions in waveguides
[INPE-2369-PRE/409] N83-12328

WAVELENGTHS
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility
[NASA-TM-83969] N83-12396

WEAR
Tribology N83-12167

WEATHER
The weather anomalies during the northern summers of 1972 and 1978 over Africa N83-12743
Air Weather Service (AWS) climatic briefs: North America
[AD-A118448] N83-12766
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118461] N83-12767
Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F
[AD-A118509] N83-12770
Seattle Tacoma IAP, Washington. Revised Unifrom Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118508] N83-12771
Bitburg Air Base, West Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118507] N83-12772
Natrona County/Casper, Wyoming. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118506] N83-12773
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118505] N83-12774
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Osan AB, Korea
[AD-A118472] N83-12775
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York
[AD-A118471] N83-12776
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Fort Know/Godman AAF, Kentucky, parts A-F
[AD-A118462] N83-12777
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Wurtsmith AFB, Mich., Parts A-F
[AD-A118510] N83-12780
Numerical modeling of tropical weather systems
[AD-A118836] N83-12784
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3, summary of data collected 27 Nov. 1978 - 6 Mar. 1979
[GARP-FOR-3] N83-12806
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979
[GARP-FOR-4] N83-12807
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808

WEATHER FORECASTING
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
Radar analysis for severe weather detection and tracking
[FAA-RD-82-64] N83-12719
Forecasting the series of rainfalls at Fortaleza using the Burg maximum entropy method
[INPE-2546-RPE/420] N83-12722
The climate of Africa, including feasibility study of climate alert system N83-12737
A climatological study of the AFGL mesonetwork, volume 1
[AD-A118766] N83-12768
World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795
Focusing mechanisms in the Texas flash floods of 1978
[PB82-185380] N83-12822

WEATHER STATIONS
Receiving station for WEFAX signals
[INPE-2501-NTE/191] N83-12307
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
A climatological study of the AFGL mesonetwork, volume 1
[AD-A118766] N83-12768
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979
[GARP-FOR-1] N83-12794
Basic synoptic networks of observing stations
[WMO-217] N83-12800
Manual on the global observing system. Volume 1 (annex to the WMO technical regulations): Global aspects, 1981 edition
[WMO-544-VOL-1-ANNEX] N83-12801
Report of the second session of the Intergovernmental Planning Meeting on Alpex --- Alpine experiment (Alpex)
[GARP-SPEC-REPT-39] N83-12804

WEIGHT (MASS)
Automated balance for determining true mass
[DE82-021737] N83-12402

WEIGHT INDICATORS
Automated balance for determining true mass
[DE82-021737] N83-12402

WELD STRENGTH
Application of aluminium alloys to large welded structures in Japan N83-12216

WELDABILITY
Application of aluminium alloys to large welded structures in Japan N83-12216

WELDED JOINTS
Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438

WELDED STRUCTURES
Application of aluminium alloys to large welded structures in Japan N83-12216

WELDING
Advances in metals processing N83-12157
Application of aluminium alloys to large welded structures in Japan N83-12216
Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438

WELDING MACHINES
Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438

WETTING
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482

WHEAT
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488
Winter wheat stand density determination and yield estimates from handheld and airborne scanners --- Montana
[E83-10013] N83-12492
Data documentation for the 1981 summer vegetation experiment --- Kansas River floodplain
[E83-10016] N83-12499

WHEELS
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461

WILDLIFE
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom --- insecticides in the food chain N83-12634
Organochlorine pesticides in organisms of wild animals of terrestrial ecosystems --- in the U.S.S.R. N83-12636
Study of wild animal pollution by pesticides: Methodological aspects N83-12642

WIND (METEOROLOGY)
Hybrid LTA vehicle controllability as affected by buoyancy ratio
[NASA-CR-152344] N83-12099
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118461] N83-12767

Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F
[AD-A118509] N83-12770
Seattle Tacoma IAP, Washington. Revised Unifrom Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118508] N83-12771
Bitburg Air Base, West Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118507] N83-12772
Natrona County/Casper, Wyoming. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118506] N83-12773
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118505] N83-12774
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York
[AD-A118471] N83-12776
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Fort Know/Godman AAF, Kentucky, parts A-F
[AD-A118462] N83-12777
Boundary-layer mesoscale wind analysis
[DE82-020414] N83-12786
Weather and airborne organisms
[WMO-562] N83-12793
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808

WIND DIRECTION
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785
Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827

WIND EFFECTS
Climatological aspects of building with special reference to wind related phenomena N83-12760

WIND MEASUREMENT
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751

WIND PROFILES
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045

WIND SHEAR
The behavior of LNG vapor clouds: Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] N83-12665

WIND TUNNEL MODELS
Application of Zimmerman flutter-margin criterion to a wind tunnel model
[NASA-TM-84545] N83-12070

WIND TUNNEL TESTS
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
Wakes produced by single-element and multiple-element wind turbine towers N83-12533
LNG plume interaction with surface obstacles
[PB82-198995] N83-12686

WIND TUNNEL WALLS
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043
Extraction of model performance from wall data in a 2-dimensional transonic flexible walled test section
[NASA-CR-165994] N83-12102

WIND TUNNELS
Adaptation of laser velocimeters to various applications N83-12410

WIND TURBINES
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526
General introduction to wind energy conversion
[NLR-MP-81014-U] N83-12527
Horizontal and vertical axis wind turbines N83-12529
Aerodynamic analysis of horizontal axis wind turbines N83-12530
Airfoil data for wind turbines N83-12531
Control systems for horizontal-axis wind turbines N83-12532
Wakes produced by single-element and multiple-element wind turbine towers N83-12533
Users manual for WIND N83-12534
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter N83-12535
Darrieus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] N83-12564
Safety data for small wind systems
[DE82-015400] N83-12565
Methodologies for assessing windpower potential N83-12759

WIND VELOCITY
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
Methodologies for assessing windpower potential N83-12759
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785

WIND VELOCITY MEASUREMENT
A calibrator for optical instruments that measure Cn2 and crosswind
[PB82-188020] N83-12406
Long range LDA wind velocity measurements using visible laser radiation N83-12415

WINDMILLS (WINDPOWERED MACHINES)
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] N83-12522

WINDOWS (APERTURES)
Direct beam-quality measurement in pulsed aerodynamic windows
[DE82-019285] N83-12429
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987

WINDPOWER UTILIZATION
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526
General introduction to wind energy conversion
[NLR-MP-81014-U] N83-12527
Site characteristics for wind energy conversion devices N83-12528
Horizontal and vertical axis wind turbines N83-12529
Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 N83-12536
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS)
[DE82-017394] N83-12788

WINDPOWERED GENERATORS
Safety data for small wind systems
[DE82-015400] N83-12565
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785

WING FLAPS
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092

WING LOADING
An investigation of the aerodynamic characteristics of a new general aviation airfoil in flight
[NASA-CR-169477] N83-12046
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092

WING NACELLE CONFIGURATIONS
Aerodynamics on a transport aircraft type wing-body mode
[PB82-206855] N83-12081

WINTER
The weather anomalies during the northern summers of 1972 and 1978 over Africa N83-12743

WIRE
Slack wire strike protection concepts
[AD-A118827] N83-12056

WOOD
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256

WORKLOADS (PSYCHOPHYSIOLOGY)
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat
[NASA-TM-76955] N83-12848
The relationship between effort rating and performance in a critical tracking task
[FAA-EM-81-13] N83-12853

WORLD DATA CENTERS
World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802

WORLD METEOROLOGICAL ORGANIZATION
The WMO background air pollution monitoring network (BAPMON) N83-12604
First planning meeting for the typhoon operational experiment (TOPEX) --- Tokyo, 17-26 Jun. 1980
[WMO-565] N83-12789
World Weather Watch. Overall report on the Voluntary Cooperation Program, notably on projects approved for transmission to members of the WMO in 1980
[OMM-571] N83-12799
Commission for Marine Technology: Abridged report of the 8th Session --- resolutions and recommendations for ocean exploration and exploitation
[WMO-584] N83-12803
Activities of the WMO
[WMO-592] N83-12811

WYOMING
Rock mechanics investigation of two bed trona mining, Green River, Wyoming
[PB82-177312] N83-12709

X

X RAY ASTRONOMY
The Pinhole/Occulter facility
[NASA-TP-2089] N83-13048

X RAY DIFFRACTION
The correlation of nitrocellulose properties and cellulose feedstock crystal structure
[AD-A118677] N83-13012

Y

YAG LASERS
Manufacturing methods and technology engineering for growth of large diameter Nd: YAG laser crystals
[AD-A118748] N83-13019

YIELD
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571
Prediction of range production from weather records in Africa --- livestock breeding N83-12748
Climatological aspects of in-harvest and post-harvest losses N83-12749
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750

Z

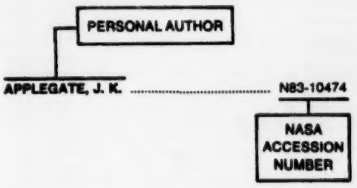
ZINC COMPOUNDS
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016

ZIRCALOYS (TRADEMARK)
Metallographic standards for estimating hydrogen content of Zircaloy-4 tubing (LWBR development program)
[PB82-022074] N83-12225

ZIRCONIUM ALLOYS
Preparation of zirconium-nickel alloy by powder metallurgy N83-12232

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AASE, J. K. N83-12492
ABBEY, O. B. N83-12785
ABDELNOUR, Z. A. N83-12329
ABDU, M. A. N83-12679
ACE, R. E. N83-12061
N83-12068
ACHAR, B. N. N83-12239
ADAMS, J. A. N83-12566
ADAMS, J. H., JR. N83-12871
ADAMSON, M. J. N83-12173
ADAR, R. N83-12848
N83-12849
AFOUDA, A. A. N83-12763
AGEE, W. S. N83-12122
AGGARWAL, K. C. N83-12172
AHERRON, R. M. N83-12394
AHUJA, K. K. N83-12968
AIELLO, R. A. N83-12460
AINLEY, D. G. N83-12840
AKAIKE, H. N83-12940
ALBING, C. N83-12670
ALI, A. W. N83-12999
ALLEMAND, C. N83-12436
ALLEN, C. N83-12499
ALLRED, R. N83-12548
ALMEIDA, A. D. N83-12694
ALTHERR, J. D. N83-12716
ALWANG, W. G. N83-12261
N83-12262
N83-12264
AMIS, M. L. N83-12487
ANANTHAKRISHNAN, R. N83-12824
N83-12825
ANDERSON, C. F. N83-12104
ANDERSON, C. L. N83-13014
ANDERSON, D. N83-12146
ANDERSON, L. A. N83-12892
N83-12893
ANDERSON, O. L. N83-12353
N83-12354
ANDRASCH, U. N83-12629
ANDRE, R. G. B. N83-12694
ANDRUSHAITUS, G. P. N83-12639
ANSOURIAN, P. N83-12479
ANYAMBA, E. K. N83-12740
APPLE, C. N83-12668
APPLETON, B. R. N83-12223
ARARI, N. N83-12597
ARDELL, A. J. N83-12221
ARGYRIS, J. H. N83-12535
ARIELI, A. N83-12220
ARMSTRONG, J. R. N83-12890
ARNOLD, C. N83-12170
ARNONE, R. A. N83-12834
ARVIDSON, J. M. N83-12470
ASNANI, G. C. N83-12737
ASPINALL, J. N83-12950
ATTENBERGER, S. E. N83-13006
AUCOIN, P. J. N83-12866
AUDET, H. N83-12508
AUGSTEIN, E. N83-12733
AUPING, J. V. N83-12181
AVERBUCH, A. N83-12974
AVERILL, R. D. N83-12398
AWKER, R. W. N83-12072

B

BABKINA, E. N83-12650
BACA, L. S. N83-12951
BACON, I. R. N83-12843
BADENKOV, Y. P. N83-12641
BAGGET, J. F. N83-12258
BAGHDASRIAN, V. G. N83-12212
BAIL, W. N83-12876
BAILEY, A. N83-12191
BAILEY, D. N83-12895
BAILEY, M. E. N83-12170
BAILEY, R. E. N83-12100
BAKER, A. J. N83-12352
BAKER, G. G. N83-12201
BAKER, T. J. N83-12379
BAKRE, S. N83-13036
BALDWIN, R. R. N83-12184
BALDY, C. N83-12751
BALES, T. T. N83-12157
BALESTRINI, S. J. N83-12907
BALLEIRO, M. G. N83-12691
BAMBACE, L. A. W. N83-12917
BARBIERI, R. W. N83-12829
BARCLAY, J. A. N83-12344
BARKER, S. N. N83-12204
BARNES, K. A. N83-12589
BARNETT, T. P. N83-12836
BARNWELL, R. W. N83-12133
BASHARKHAH, M. A. N83-12286
BASILI, V. N83-12880
BASS, L. N83-12565
BASS, L. J. N83-12892
N83-12893
BASSON, G. R. N83-12290
BASTOS-NETTO, D. N83-12180
BASU, S. N83-12231
BATES, S. C. N83-13008
BATISTA, I. S. N83-12679
BATISTA, P. P. N83-13046
BAUCOM, R. M. N83-12153
BAUER, M. E. N83-12506
BAUM, E. A. N83-12042
BAUMGARDNER, M. F. N83-12504
BEAL, R. C. N83-12326
BEAN, J. W. N83-12388
BECKER, C. H. N83-12979
BECKER, J. D. N83-12704
BELL, B. A. N83-12656
BELL, E. J. N83-12584
BELL, M. N83-12064
BELL, R. N83-12396
BELOV, G. N83-12650
BELT, R. F. N83-13019
BEMENT, T. R. N83-12512
BENCH, P. M. N83-12699
BENDER, G. L. N83-12075
BENDURA, R. J. N83-12595
BENNETT, R. M. N83-12070
BERGAMINI, E. W. N83-12296
BERLIN, J. I. N83-12854
N83-12855
BERLYAND, M. E. N83-12607
BERMAN, V. N83-12876
BERNDT, E. R. N83-12591
BEWICK, A. N83-12186
N83-12194
N83-12195
BHARUCHA, R. R. N83-13036
BHATTACHARYA, S. K. N83-12405
BHATTACHARYYA, S. N83-12215
BIEGELSEN, D. K. N83-13021
BIEHL, L. L. N83-12504
BISHOP, E. F. N83-13027
N83-13028
BISHOP, M. O. N83-12571
BLACKBURN, J. E. N83-12839
BLACKMAN, P. W. N83-13030
BLACKMER, W. N83-12902
BLACKMON, P. W. N83-13029
N83-13031
N83-13032
N83-13033
N83-13034
BLAKELY, A. D. N83-12079
BLANCHARD, D. O. N83-12816
BLANKENSHIP, C. P. N83-12147
BLEVINS, R. P. N83-12559
BLOCK-BOLTEN, A. N83-12436
BLOEDORN, J. N83-12565
BLOOMER, H. E. N83-12092
BOBBITT, P. J. N83-12133
BOBOVNIKOVA, T. N83-12650
BOCLET, D. N83-12684
N83-12686
BOEHM, A. R. N83-12782
BOGAR, T. J. N83-12052
BOHN, M. N83-12588
BOHON, H. L. N83-12148
BOLI, B. N83-12886
BOLIN, B. N83-12792
BOLLEN, W. M. N83-12999
BOLZ, E. H. N83-12065
BONATTI, J. P. N83-12678
BORMAN, K. N83-12838
BORZILOV, V. A. N83-12640
BOSTICK, F. X. N83-12704
BOSTICK, W. N83-12981
BOTTOMLEY, D. N83-12060
BOUTIER, A. N83-12411
BOUTLER, A. N83-12409
N83-12410
BOWEN, A. J., JR. N83-12490
BOWMAN, J. N83-12832
BOXWELL, D. A. N83-12972
BRABBS, T. A. N83-12182
BRACCO, F. V. N83-12188
BRAUN, K. A. N83-12535
BRAUNLICH, P. F. N83-13020
BRAY, G. N83-12876
BRAZHNIKOVA, L. V. N83-12645
BRECKINRIDGE, J. B. N83-12992
BREMER, ... N83-12345
BRENER, N. E. N83-13011
BRENTJES, A. J. N83-12928
BRIGGS, H. C. N83-12464
BRIGGS, K. B. N83-12835
BRIGGS, M. J. N83-12476
BRISCO, B. N83-12499
BRITTING, K. N83-12069
BRODRICK, H. J. N83-12826
BROKAW, R. S. N83-12182
BRONISZ, S. E. N83-12988
BROOKS, E. W. N83-12457
BROWN, H. A. N83-12768
BROWN, J. H. N83-12699
BROWN, W. K. N83-12465
BRUNO, C. N83-12188
BRYANT, J. N83-12495
BRYANT, L. A. N83-12863
N83-12864
N83-12865
BUCK, J. W. N83-12785
BUCKLEY, D. H. N83-12167
BUCKNER, C. D. N83-12475
BUCZEK, M. B. N83-12213
BUDYKO, M. I. N83-12624
BUFFINGTON, J. D. N83-12625
BUIVAN, N. A. N83-12689
BUNKER, R. E. N83-12892
N83-12893
BUNNEY, R. E. N83-12830
BUNTING, J. T. N83-12779
BURATTI, D. L. N83-12887
BURGES, S. J. N83-12518
BURNER, A. W. N83-12395
BURNS, J. A. N83-12050
BURPEE, R. W. N83-12728
BURRIN, R. H. N83-12968

BUTLER, T. G. N83-12453
N83-12467
BUTOWSKY, H. N83-13023
BUTZKE, G. L. N83-12971
BYRNES, J. B. N83-12882

C

CAHIR, J. J. N83-12821
CALLINAN, R. J. N83-12172
CALO, J. M. N83-12945
CAMPBELL, E. M. N83-12427
CANAVAN, M. M. N83-12276
CARACENA, F. N83-12822
CARLEIAL, A. B. N83-12301
N83-12302
CARMIGGELT, C. J. W. N83-12661
CARPENTER, C. A. N83-12055
CARPENTER, J. F. N83-12177
CARR, L. W. N83-12048
CARRIER, G. N83-12282
CARTER, A. L. N83-12135
CASEY, M. J. N83-12816
CATTO, P. J. N83-13002
N83-13003
CAVALCANTI, I. F. D. A. N83-12723
CEKIS, M. M. N83-12884
CETRON, M. J. N83-13027
N83-13028
CHAGAS, J. C. S. N83-13045
CHALMERS, B. B. N83-12566
CHAMIS, C. C. N83-12460
CHANG, J. B. N83-12077
N83-12078
CHANG, S. N83-12784
CHAPEL, W. N83-12064
CHAPMAN, R. D. N83-13040
CHARKEY, A. N83-12572
CHEN, C. H. S. N83-12461
CHEN, E. S. N83-12219
CHEN, K. M. N83-12316
CHEN, K. S. N83-12386
CHEN, M. M. N83-12387
CHEN, P. C. T. N83-12462
CHEN, Y. H. N83-12831
CHERKHANOV, Y. P. N83-12609
CHEZEM, C. G. N83-12907
CHIAPPETTA, L. M. N83-12353
N83-12354
CHILDS, J. M. N83-12083
CHIMISHKYAN, A. L. N83-12643
CHIVERS, J. W. H. N83-12275
CHOI, C. S. N83-13012
CHRISINGER, L. E. N83-12464
CHRISTIANSEN, T. R. N83-12400
CHUNG, K. C. N83-12202
CHUSN, G., JR. N83-12584
CICONE, R. N83-12500
CIHA, A. J. N83-12482
CLANCY, M. N83-12833
CLARK, B. A. J. N83-12057
CLARK, J. C. N83-12664
CLARK, M. D. N83-13014
CLARKSON, J. E. N83-12571
CLAUS, R. O. N83-12397
N83-12969
CLEMESHA, B. R. N83-12407
N83-12677
N83-12680
N83-13046
CLIFF, E. M. N83-12050
COATES, J. F. N83-12276
N83-12277
COBERLY, W. A. N83-12498
COCANOWER, A. N83-12069
COE, R. N83-12744
COFFEY, H. E. N83-13050
N83-13052
N83-13054
N83-13055
N83-13056
COFFINBERRY, G. A. N83-12247
COHEN, I. D. N83-12783
COLLA, N. H. N83-12302
COLLIS, W. J. N83-12562
COMMINS, M. L. N83-12661
CONINE, D. L. N83-12560
COOPER, D. N83-12944
COOPER, L. N83-12667
CORBIN, M. A. N83-12319
CORSER, G. N83-12944
COUNAS, G. N83-12345
COUSTEIX, J. N83-12364
COWIN, J. P. N83-12982
COWPERTHWAITE, M. N83-12251
COX, G. N83-12209
CRAMER, M. N83-12574
N83-12576
CRANDALL, M. G. N83-12938
CRANE, R. K. N83-12719
CRIST, E. P. N83-12500
N83-12501
CRISWELL, D. R. N83-12109
CRUSCICKI, A. J. N83-12891
CURTIS, P. M. N83-12188
CURTISS, H. C., JR. N83-12051
CUSHEN, W. E. N83-12278
CUSHMAN, J. B. N83-12450
CYBYK, B. Z. N83-12143

D

DABBS, J. R. N83-13048
DACOSTA, J. M. N83-12684
N83-12686
DAHAN, C. N83-12972
DAILEY, C. L. N83-12144
N83-12145
DANDEKAR, B. S. N83-12700
DANIELS, C. J. N83-12359
DANISON, T. H. N83-12252
DARBY, R. N83-12592
DARWISH, A. Y. N83-12240
DAVIDSON, J. R. N83-12158
DAVIDSON, T. N83-12186
N83-12195
DAVIS, L. S. N83-12897
DAVIS, R. F. N83-13018
DAVIS, R. T. N83-12376
N83-12377
DAVISON, T. N83-12194
DAVY, E. G. N83-12741
DEBOOR, C. N83-12937
DECHAUMPHAI, P. N83-12356
DEEPAK, A. N83-12682
DEGARRIDO, J. C. P. N83-12294
DEGENS, E. T. N83-12631
DEISSLER, R. G. N83-12357
DELANEY, J. J. N83-12985
DELAPPE, B. W. N83-12638
DELECOLLE, R. N83-12751
DELIMA, U. M. B. N83-12883
DELUISI, J. J. N83-12813
DEMAS, J. N. N83-12426
DEMEDEIROS, V. M. N83-12128
DEMORAES, I. M. N83-12126
DENISOVA, A. V. N83-12636
N83-12642
DENSON, A. L. N83-12857
DENTREMONT, R. P. N83-12779
DEPAULA, E. R. N83-12688
DEPINTO, J. V. N83-12657
DEROSE, R. N83-12263
N83-12266
N83-12267
DESAI, U. N83-13047
DESOUZA, A. C. R. N83-12688
DESOUZA, R. C. M. N83-12923
DESROSIERS, R. N83-12200
DEVAN, J. H. N83-12223
DEVRIES, O. N83-12527
DEWAAL, D. J. N83-12952
N83-12953
N83-12955
DEXTERN, H. B. N83-12164
DIAS, A. R. N83-12303
DIAS, L. A. V. N83-12681
DIAS, P. L. D. N83-12687
N83-12922
DICK, E. N83-12375
DICK, J. J. N83-12430
DIPPOLITO, D. A. N83-13002
N83-13003
DISMUKES, K. N83-12860
DJAFERIS, T. E. N83-12918
DOBRYSHMAN, E. M. N83-12729
DOBSON, M. C. N83-12503
DODDAPANENI, N. N83-12537
DOESPIRITOSANTO, C. M. N83-12990
DOGGETT, W. O. N83-12978
DOKKO, W. N83-12237
DOMAS, P. A. N83-12451
DONALDSON, S. L. N83-12471
DONNELLY, R. F. N83-13057
DOOLEY, J. L. N83-12439
DORNHOFF, A. G. N83-12916
DOSOKY, M. M. N83-12458
DOSSANTOS, R. P. N83-12721
DOUGLASS, D. L. N83-12224
DOWGIALLO, E. J., JR. N83-13040
DOWSON, D. N83-12432
DRESHFIELD, R. L. N83-12155
DUMELOW, J. N83-12744
DUNN, G. N83-12436
DUNN, J. R. N83-12840
DUPANLOUP, M. N83-12716
DURAND, F. N83-12556
DUROCHER, L. L. N83-12456
DUROUCHOUX, P. N83-12684
N83-12686
DURST, F. N83-12412
N83-12413
N83-12414
N83-12415
N83-12416
N83-12417
DUTRA, S. L. G. N83-12688
N83-12690
DUVALL, K. N83-12315
DVORSKY, L. A. N83-12063
DWIGHT, K. N83-13017
DYHR-NIELSEN, M. N83-12516

E

EAGAR, T. W. N83-12436
ECHARD, J. D. N83-12283
ECKELMEYER, K. H. N83-12222
EDWARDS, C. L. W. N83-12133
EDWARDS, D. E. N83-12353
N83-12354
EDWARDS, M. B. N83-12708
EDWARDS, P. L. N83-12970
EDWARDS, T. R. N83-12932
EDWARDSON, S. M. N83-12292
EFURD, R. B. N83-12319
EGER, G. W., III N83-12485
EHRLICH, S. A. N83-12224
EIJGENRAAM, P. N83-12926
EISENBERG, J. D. N83-12091
EKDAHL, C. A. N83-12981
ELDER, R. L. N83-12268
N83-12269
N83-12270
ELIAS, M. N83-12692
ELIASSEN, A. N83-12663
ELKAREH, A. B. N83-12443
ELLEMAN, D. D. N83-12335
ELLINGSON, W. A. N83-12253
ELWELL, D. N83-12552
EMERY, J. D. N83-12949
ENTING, I. G. N83-12676
ERLICH, D. N83-12814
ESTES, J. M. N83-12305
EVANS, L. C. N83-12938
EVERSTINE, G. C. N83-12463

F

FAIRBANKS, A. N83-12099
FALKOVICH, A. I. N83-12732
FAN, S. K. N83-12436
FANNEY, A. H. N83-12287
FARMER, G. N83-12745
FARNUM, B. W. N83-12201
FARNUM, S. A. N83-12201
FARNWORTH, B. N83-12382
FARRAR, J. F. N83-12632
FARRELL, K. N83-12223
FAUCHER, G. N83-12699
FAY, J. A. N83-12659
FEDERICO, G. N83-12191
FEELY, R. A. N83-12837
FEIGELSON, E. M. N83-12734
FEIGELSON, R. S. N83-12552
FEIK, R. A. N83-12097
FENDELL, F. N83-12282
FERET, J. M. N83-12524
FERRAGUT, N. J. N83-12466
FERREIRA, D. L. N83-12125
N83-12127
FERREIRA, L. D. D. N83-12123
FERZIGER, J. H. N83-12373
FICHTEL, C. E. N83-13042
FILHO, O. B. D. N83-12351
FILIPPOVA, L. M. N83-12633
FINK, S. N83-12282
FIORE, C. L. N83-13007
FISHBACH, L. H. N83-12087
FLANDERS, A. F. N83-12514
FLEETER, R. N83-12246
FLYNN, T. N83-12584
FOHLEN, G. M. N83-12239
FOOTE-LENNOX, L. N83-12870

FOOTE-LENNOX, T. N83-12870
FOOTE, J. H. N83-13001
FORBES, J. M. N83-12701
FOREMAN, K. D. N83-12343
FORSTER, C. N83-12269
N83-12270
FOX, G. L. N83-12455
N83-12468
FRAME, E. A. N83-12241
FRANCHITO, S. H. N83-12721
FRANCISCUS, L. C. N83-12087
FRANK, K. H. N83-12477
FRANKLIN, D. P. N83-12510
FRERE, M. N83-12742
FRIDMAN, S. D. N83-12620
FRIEDMAN, D. M. N83-12047
FRIEDMAN, J. H. N83-12931
N83-12958
FRITSCH, J. M. N83-12822
FROMM, M. D. N83-12821
FRY, J. L. N83-13011
FRYE, D. N83-12895
FUJIMOTO, T. N83-12977
FUJISAWA, Y. N83-12086
FUKUDA, M. N83-12348
FULLERTON, S. N83-12625

G

GALKIN, L. M. N83-12653
GANDY, R. N83-13007
GANGULY, S. N83-12129
GANTER, Y. N83-12716
GARBOW, B. S. N83-12884
GARD, T. C. N83-12669
GARKAVAYA, T. K. N83-12231
GASPER, A. F. N83-12456
GATES, T. A. N83-12040
GAUSMAN, H. W. N83-12489
GAZIEV, Y. N83-12650
GBUR, E. E. N83-12505
GEAR, C. W. N83-12946
GEARHART, W. S. N83-12096
GECKLE, W. J. N83-12326
GEIGER, H. N83-12797
GELFAND, E. M. N83-12112
GEORGE, C. W. N83-12079
GERLACH, A. M. N83-12781
GERTZ, J. L. N83-12867
GHANTOUS, C. A. N83-12045
GIBBINGS, J. C. N83-12042
GIBSON, N. N83-12042
GILAT, T. N83-12849
GILCHRIST, A. N83-12730
GILL, M. E. N83-12269
N83-12270
GILWEE, W. J. N83-12150
GLASS, I. I. N83-12384
GLOWACKI, E. F. N83-12058
GOAD, W. K. N83-12395
GODEFROY, J. C. N83-12273
GODFREY, B. B. N83-12981
GODOY, S. G. N83-12887
GOGLIA, G. L. N83-12355
GOLDBERG, A. N83-12341
GOLDENBAUM, G. C. N83-13004
GOLDFINGER, A. D. N83-12326
GOLDOWSKY, M. P. N83-12332
GOLDSTEIN, H. E. N83-12160
GOLDSTEIN, W. A. N83-12482
GOMMES, R. N83-12750
GOOCH, R. N83-12315
GOOD, R. E. N83-12699
GOODYER, M. J. N83-12102
GOPAL, I. N83-12129
GOPALAN, K. N83-12405
GORDON, J. E. N83-12057
GORENEWALD, P. C. N. N83-12956
GOSS, W. C. N83-12991
GOSSARD, E. E. N83-12815
GRAHAM, R. W. N83-12360
GRANATO, E. N83-13010
GRANNEMAN, E. H. A. N83-13004
GRAVES, C. N83-12625
GRAY, F. G. N83-12890
GRAY, H. R. N83-12155
GRAY, J. L. N83-12550
GRAYBEAL, A. G. N83-12428
GREENBAUM, E. N83-12206
GREENWALD, A. C. N83-13013
GREENWALD, M. J. N83-13007
GREENWOOD, E. N83-12340
GREGOREK, G. M. N83-12046
GREGORY, L. J. N83-12571
GRENON, L. N83-12551
GRIFFIN, K. E. N83-12053
GRIFFIN, P. D. N83-12448
GRIFFING, G. W. N83-12715
GRIGSBY, R. D. N83-12202
GRIMES, H. H. N83-12161
GRINDSTAFF, Q. G. N83-12202
GRINGORTEN, I. I. N83-12778
N83-12782
GROENEWALD, P. C. N. N83-12952
N83-12954
N83-12955
GROSSE, E. N83-12931
GRUBER, A. N83-12826
GRUBER, E. V. N83-12854
N83-12855
GRUBER, R. P. N83-12141
GRYZLOVA, G. K. N83-12643
GUADAGNINO, C. L. N83-12076
GUDERIAN, B. W. N83-12406
GUENTHER, G. C. N83-12838
GUM, J. S. N83-12434
GUPTA, A. N83-12069
GUPTA, A. K. N83-12477
GUPTA, S. S. N83-12943
N83-12961
GUSEMAN, L. F., JR. N83-12494
GUSSENHOVEN, M. S. N83-12130
GWINN, D. A. N83-13007
GWYNNE, M. D. N83-12603
GYLES, B. N83-12274

H

HACKBUSCH, W. N83-12374
HADLEY, D. L. N83-12785
HAEHN, S. E. N83-12899
N83-12900
N83-12901
HAGEMANN, M. G. N83-12482
HAGEN, L. J. N83-12564
HALFORD, G. R. N83-12159
HALL, R. C. N83-12915
HALLAM, S. L. N83-12708
HAMED, A. N83-12045
HAMILTON, R. E. N83-12303
HAMLIN, H. S. N83-12708
HAMMOND, R. P. N83-12439
HAMROCK, B. J. N83-12432
HAN-URA, T. N83-12472
HANEMAN, D. N83-13021
HANKER, E. J., JR. N83-12051
HANNA, P. C. N83-13008
HANNA, S. R. N83-12662
HANSEN, E. M. N83-12823
HANSEN, M. M. N83-12671
HANSER, F. A. N83-12401
HANSON, K. J. N83-12619
HARDT, D. N83-12436
HARLACHER, B. L. N83-12136
N83-12137
HARMAN, W. H. N83-12066
N83-12067
HARNISH, L. O. N83-12309
HART, G. W. N83-12555
N83-12568
HARTMAN, C. W. N83-13004
HARTMAN, J. S. N83-12545
HARTMANN, M. J. N83-12090
HARTWIG, E. O. N83-12661
HASEGAWA, S. N83-12140
HASELTON, H. H. N83-12984
HASHIMOTO, R. N83-12140
HAUTH, D. C. N83-12590
HAWKINS, J. N83-12511
HAWKINS, J. L. N83-12502
HAYES, K. R. N83-12217
HAYS, D. D. N83-12428
HAYS, R. T. N83-12106
HEILMAN, J. N83-12496
HEIMBUCH, A. H. N83-12150
HEISEY, J. B. N83-12250
HELLER, S. N83-12914
HELMERS, R. N83-12927
HENDRICKSON, B. N83-12244
HENDRY, J. J. N83-13027
N83-13028
HERAKOVICH, C. T. N83-12213
HERNDON, J. W. N83-12103
HERTZBERG, M. N83-12205
HERZ, J. N83-12548
HERZOG, F. N83-12565
HESS, J. L. N83-12047
HEWITT, D. R. N83-12361
HEYMAN, J. S. N83-12169
HICKMAN, A. P. N83-12979
HIEBERT, A. L. N83-12111
HIEN, T. D. N83-12444
HIERBAUM, F. F., JR. N83-12060
HIERL, P. M. N83-12696
HIGGINS, L. B. N83-12075
HIGHSMITH, A. L. N83-12179
HILL, V. L. N83-12215
HILLAN, W. J. N83-12190
HILLIER, I. H. N83-12985
HINZPETER, H. N83-12733
HIRAMATSU, K. N83-12180
HIRT, E. F. N83-12455
HISCOX, W. L. N83-12816
HITCHCOCK, H. H. N83-12276
N83-12277
HIYAMA, R. M. N83-12077
HJALMARSON, A. N83-13044
HO, C. M. N83-12380
HO, J. N83-12339
HOCKING, G. N83-12556
HODGES, T. N83-12483
HOELLIG, K. N83-12937
HOFFMANN, M. J. N83-12046
HOGG, C. S. N83-12982
HOLLE, R. L. N83-12817
HOLLOW, R. H. N83-12098
HOLME, O. A. M. N83-12530
HOLMES, C. W. N83-12854
N83-12855
HOLYER, R. N83-12511
HOMAN, M. L. N83-12104
HONABLEW, J. H. N83-12898
HONEA, D. L. N83-12107
N83-12108
HONG, J. H. N83-12208
HORNE, A. J. N83-12661
HORNER, M. W. N83-12437
HORNER, R. A. N83-12840
HORTON, S. N83-12833
HOSHINO, H. N83-12522
HOULBERG, W. A. N83-13006
HOUSSIAU, M. N83-12750
HOWARD, B. D. N83-12539
HOWELL, A. H. N83-12054
HOWERTON, R. J. N83-12203
HRYNIEWICZ, R. N83-12610
HSU, C. H. N83-12226
HSU, M. N83-12069
HUANG, W. T. N83-12961
HUDSON, H. S. N83-13048
HUERTAS, A. N83-12994
HUGGINS, R. A. N83-12552
HUGHES, T. J. R. N83-12473
HUGHES, T. P. N83-12981
HUITT, B. E. N83-12319
HULME, G. N83-12371
HUMPHREY, J. A. C. N83-12386
HUNT, G. L. N83-12839
N83-12841
HUNT, L. E. N83-12449
HUNTER, G. N83-12436
HUNTINGTON, C. N83-12436
HURWITZ, F. I. N83-12176
HURWITZ, M. M. N83-12457
HUSS, E. B. N83-12571
HWANG, C. S. N83-12202
HYATT, B. Z. N83-12225

I

ILIEV, I. N83-12622
INGRAM, C. N83-12832
INSAROV, G. E. N83-12633
IONOV, V. A. N83-12620
ISAKEN, I. N83-12663
ISHIDA, Y. N83-12522
ISHIGAKI, H. N83-12347
ISHIKAWA, M. N83-13005
ISHIMURA, T. N83-12995
ISLIEFSON, R. E. N83-12341
ISSA, R. I. N83-12378
IVANOVA, A. A. N83-12626
IZRAEL, Y. A. N83-12600
N83-12618
IZUMIKAWA, M. N83-12139

J

JACKSON, P. L. N83-12305
JACKSON, R. D. N83-12488
JACKSON, W. N83-13021
JAKUB, A. N83-12246
JAMBA, D. M. N83-13022
JANA, R. K. N83-12752

JANUS, P. J. N83-12892
N83-12893
JARDIM, J. O. D. N83-12684
N83-12685
N83-12686
JARDIM, M. V. A. N83-12684
JASSEM, W. N83-12291
JAWOROWSKI, Z. N83-12594
JENSEN, P. K. N83-12854
N83-12855
JEWELL, W. J. N83-12670
JHIRAD, D. J. N83-12558
JIRIK, L. A. N83-12708
JOBE, T. L., JR. N83-12207
JOHANSSON, L. E. B. N83-13044
JOHN, F. N83-12939
JOHNSON, G. M. N83-12079
N83-12930
JOHNSON, M. E. N83-12512
JOHNSON, N. L. N83-12441
JOHNSON, R. T., JR. N83-12342
JOHNSTON, N. J. N83-12149
JOHNSTON, R. P. N83-12094
JONES, C. N83-12973
JONES, G. K. N83-12879
JONES, I. R. N83-12338
JONES, R. N83-12172
JONES, W. R., JR. N83-12433
JOYCE, T. J. N83-12257
JUDGE, R. J. R. N83-12136
JUNET, E. N83-12716

K

KABRICK, R. M. N83-12670
KAGANO, M. T. N83-12687
N83-12827
N83-12922
KAIWI, J. N83-12841
KALINOWSKI, A. J. N83-12459
KALLIS, J. M. N83-12338
KAMIJO, K. N83-12140
KAMINSKY, A. D. N83-12867
KANDA, H. N83-12043
KANE, R. P. N83-12596
KANEMASU, E. T. N83-12485
KANNEMANS, H. N83-12272
KANTOR, I. J. N83-12688
N83-12722
KAPETANAKOS, C. A. N83-12980
KAPLAN, A. N83-12993
KAPLAN, C. P. N83-12590
KAPLAN, R. N83-12380
KAPLIN, V. T. N83-12626
KAPP, J. A. N83-12218
KARAUSHEV, A. V. N83-12654
KARP, A. N83-12330
KASZA, K. E. N83-12387
KATO, T. N83-12977
KATZ, J. N83-12436
KAUFMAN, A. N83-12449
KAUFMAN, H. R. N83-12259
KEALY, W. J. N83-12869
KEATON, P. W. N83-12112
KECK, T. N83-12416
KEE, R. J. N83-12945
KELLER, W. E. N83-12344
KELLEY, J. J. N83-12606
KELLY, M. E. N83-12668
KEMPE, S. N83-12631
KENDALL, A. W. N83-12840
KENDALL, P. W. N83-12579
N83-12586
KENNEY, J. E. N83-12311
KENT, G. N83-12682
KERSHAW, R. N83-13017
KERSLAKE, W. R. N83-12143
KERZHENTSEV, A. S. N83-12623
KESTEN, M. N83-12848
KHATIBU, A. I. N83-12752
KHVALENSKY, Y. A. N83-12753
KIANGI, P. M. R. N83-12739
N83-12740
KIDD, C. H. R. N83-12757
KIENITZ, G. N83-12755
KIKUCHI, M. N83-12140
KIM, W. C. N83-12943
KINDLIMANN, L. N83-12214
KING, L. D. N83-12065
KIRCHGAESSNER, B. N83-12535
KIRCHHOFF, V. W. J. H. N83-12677
N83-12680
N83-13046
KITAGAWA, G. N83-12498
KLEIN, B. M. N83-13016
KLEINBERG, L. L. N83-12333
KLEINE, R. N83-12416
KLEMETTI, W. I. N83-12321
KLEMPERER, W. N83-12425
KNEISLEY, R. O. N83-12709
KNIGHTS, J. C. N83-13021
KNUDSON, C. L. N83-12201
KOBAYASHI, R. N83-12208
KOBYLINSKI, E. A. N83-12656
KOCH, C. C. N83-12223
KOCH, C. D. N83-12512
KOEHLER, A. N83-12604
KOENIG, B. A. N83-12584
KOHL, K. B. N83-12241
KOLESNIKOVA, T. H. N83-12626
KOLOSKOV, I. A. N83-12609
KONDO, H. N83-12086
KONDRATYEV, K. Y. N83-12734
KONO, J. N83-12301
KONTONGOMDE, H. N83-12751
KOPKE, J. E. N83-12404
KOROLENKO, P. I. N83-12645
KOROPALOV, V. M. N83-12651
KOSHINUMA, T. N83-12086
KOSTOVSKA, B. N83-12643
KOTHARI, K. M. N83-12666
KOTHARI, V. S. N83-12590
N83-12593
KOTZ, S. N83-12441
KOUSKY, V. E. N83-12717
KOVDA, V. A. N83-12623
KRAIMECHE, B. N83-12129
KRAMER, M. A. N83-12945
KRAUS, E. F. N83-12072
KRAUS, S. N83-12244
KREJSA, E. N83-12966
KRISHNA, C. M. N83-12868
KRISHNAMURTI, T. N. N83-12727
KRISHNAN, T. S. N83-12232
N83-12234
KROUTIL, J. C. N83-12052
KRZYSKO, M. N83-12291
KUBICKI, P. N83-12099
KUETTNER, J. P. N83-12726
KUHN, W. N83-12664
KULKARNI, D. R. N83-12913
N83-13036
KULKARNY, V. A. N83-12429
KUMIERSKI, P. N83-12211
KUNTZ, H. L., II N83-12967
KUPER, G. M. N83-12936
KUROWSKI, W. N83-12964
KURSAKI, Y. N83-12368
KUSUDA, T. N83-12388

L

LABOVITZ, M. L. N83-12396
LAIDERA, M. N83-12520
LAL, R. N83-12752
LAMAGNA, E. A. N83-12892
N83-12893
LAMBERGEON, D. N83-12738
LANG, R. H. N83-12306
LAO, L. L. N83-13006
LAPING, H. N83-12322
LARIN, I. K. N83-12611
LARSON, F. N83-12214
LARSON, N. M. N83-12906
LAU, J. R. N83-12854
N83-12855
LAU, T. K. N83-12254
LAUFER, J. N83-12380
LEE, B. E. N83-12760
LEE, H. Y. N83-12994
LEE, R. A. N83-12973
LEE, R. S. L. N83-12417
LEE, W. N83-12256
LEFANDE, J. M. N83-12279
LEHOUERON, H. N. N83-12748
LEMES, M. A. M. N83-12721
LENA, A. L. N83-12338
LEPICOVSKY, J. N83-12968
LERNER, B. N83-12244
LERNER, M. O. N83-12590
N83-12593
LESAR, D. E. N83-12435
LESTZ, S. S. N83-12250
LETTENMAIER, D. P. N83-12518
LEVINE, D. M. N83-12306
LEVINE, S. R. N83-12163
LEVY, E. M. N83-12630
LEWIS, J. A. N83-12842
LEWIS, M. B. N83-12223
LEWY, S. N83-12972
LIEBERMAN, M. N83-12556
LIGHT, J. C. N83-12982
LIGRANI, P. M. N83-12274
LIKENS, W. N83-12507
LIM, D. J. N83-12850
LIM, K. C. N83-12344
LIN, M. M. N83-12469
LIND, M. A. N83-12545
LINDSEY, C. E. N83-12281
LINDSEY, W. C. N83-12317
LINK, A. N. N83-13026
LIONS, P. L. N83-12938
LIPSCHULTZ, B. N83-13007
LIPSET, R. N83-12876
LISAGOR, W. B. N83-12156
LISKOW, C. L. N83-12303
LIU, K. W. N83-12078
LOBO, P. R. V. N83-12720
LONG, S. A. N83-12443
LOPEZ, R. E. N83-12816
LORENA, L. A. N. N83-12921
LORENZO, C. F. N83-12359
LOTZ, W. G. N83-12846
LOURENCAO, P. T. D. N83-12125
N83-12127
LOURENCO, L. N83-12424
LOVBERG, R. H. N83-12144
N83-12145
LOWRY, D. W. N83-12071
LUCHUK, W. N83-12104
LUKE, C. M. N83-12283
LUNDSTROM, M. S. N83-12550
LYNCH, A. N83-12436
LYSAK, A. V. N83-12618

M

MACKAY, R. A. N83-13009
MACKINNON, J. H. N83-12055
MAGER, A. N83-12235
MAGNESS, E. R. N83-12493
MAHAJAN, B. M. N83-12389
MAHONE, D. E. N83-12566
MAHONEY, P. C. N83-12553
N83-12569
MAIER, M. W. N83-12817
MAKHONKO, E. N83-12650
MALAKHOV, S. N83-12650
MALAKHOV, S. G. N83-12640
MALEY, M. P. N83-12344
MALL, O. D. N83-12072
MALLON, J. R., JR. N83-12399
MALUTAE, A. N83-12686
MANDELL, J. F. N83-12240
MANI, A. N83-12758
MANN, I. B. N83-12428
MANOVE, M. N83-12591
MANYARA, G. N83-12643
MARCUS, F. N83-12069
MARMAR, E. S. N83-13007
MARQUES, V. D. N83-12678
MARRIOTT, T. D. N83-12202
MARSDEN, J. F. N83-12063
MARSH, S. J. N83-12980
MARSHALL, W. R. N83-12138
MARTIN, I. M. N83-12684
N83-12686
N83-12689
MARTIN, J. B. N83-12258
N83-12445
N83-12446
N83-12448
MARTIN, M. V. N83-12487
MARTIN, P. N83-12833
MARTIN, P. M. N83-12428
MARTIN, S. N83-12828
MARX, D. G. N83-12955
MASCARENHAS, A. N83-12762
MASCARENHAS, N. D. A. N83-12923
MASCARENHAS, N. D. D. N83-12929
MASSOTH, G. J. N83-12837
MAST, N. P. N83-12660
MASTERSON, K. N83-12588
MATHEWS, D. N83-12137
MATSUDA, Y. N83-12086
MATSUKI, M. N83-12086
MATSUO, K. N83-12129
MATTAUCH, R. J. N83-12334
MATTHAEUS, W. H. N83-12998
MATUSZEWSKI, M. I. N83-12337
MATVEYEV, A. A. N83-12616
MAUPIN, G. W., JR. N83-12284
MAW, K. N83-12507
MBELE-MBONG, S. N83-12765
MCALEER, J. N83-12185
N83-12187

MCALISTER, K. W. N83-12048
MCAULIFFE, J. P. N83-12657
MCCAFFREY, B. J. N83-12209
MCCAIN, B. B. N83-12840
MCCALLUM, P. W. N83-12255
MCCARTHY, R. N83-12548
MCCLESKEY, S. F. N83-12450
MCCONKEY, E. D. N83-12061
N83-12068
MCCROSKEY, W. J. N83-12048
MCEWEN, T. J. N83-12712
MCFARLAND, R. D. N83-12578
MCGARRY, F. J. N83-12240
MCGHEE, R. B. N83-13039
MCGUIRE, W. G. N83-12487
MCINTOSH, P. S. N83-13053
MCINTYRE, A. D. N83-12615
MCKAY, M. F. N83-12866
MCKENNA, E. N83-12191
MCKENZIE, J. D. N83-12109
MCKINLEY, J. B. N83-12068
MCLARNON, F. N83-12573
MCLAUCHLAN, J. M. N83-12991
MCLEAN, E. A. N83-12427
MCLEAN, J. N83-12885
MCNULTY, J. S. N83-12252
MCNUTT, S. L. N83-12828
MCVEY, J. B. N83-12353
N83-12354
MCWHORTER, A. L. N83-13015
MEADOR, J. D. N83-12089
MEADOWS, H. E. N83-12129
MEBANE, R. C. N83-12189
N83-12192
MEDGYESIMITSCHANG, L. N. N83-12318
N83-12324
N83-12325
MEDIONI, G. G. N83-12994
MEGARGLE, R. G. N83-12181
MEISSINGER, H. F. N83-12144
N83-12145
MELENDEZ, R. E. N83-12947
MELLING, A. N83-12421
N83-12422
N83-12423
MELNICK, W. N83-12850
MENDES, C. L. N83-12923
N83-12929
MENEGHINI, R. N83-12306
MENGES, R. M. N83-12489
MENON, M. M. N83-12984
MENON, P. R. N83-12232
MERONEY, R. N. N83-12665
N83-12666
METZLER, M. N83-12500
MEYER, J. E. N83-12402
MEYER, R. E. N83-12381
MEYERS, D. N. N83-12099
MHONE, Y. C. N83-12757
MIKHAIL, A. N83-12786
MILASK, L. J. N83-12625
MILDRUM, H. F. N83-12329
MILLARD, G. H. N83-12293
MILLARD, J. P. N83-12492
MILLER, G. W. N83-12664
MILLER, T. J. N83-12161
MIL'.NER, A. E. N83-12566
MILLS, J. W. N83-12854
N83-12855
MINARDI, J. E. N83-12095
MINJA, W. S. M. N83-12743
MIRANDA, C. A. I. N83-12295
N83-12328
MITANI, T. N83-12139
MIWA, H. N83-12043
MIZUNO, M. N83-12216
N83-12388
MOELLER, G. N83-12859
MOEZZI, S. N83-12503
MOLION, L. C. B. N83-12597
MOLVIK, A. W. N83-13001
MONAGAN, S. J. N83-12100
MONOPOLI, R. V. N83-12918
MONSON, D. J. N83-12393
MONTGOMERY, D. N83-12998
MOORE, E. F. N83-12578
MOORE, N. W. N83-12634
MORALES, L. M. N83-12402
MORE, J. J. N83-12905
MORELAND, F. L. N83-12285
MORIARTY, G. N83-12313
MORITA, M. N83-12086
MORRIS, C. J. N83-12571
MORRIS, D. A. N83-12899
N83-12900
N83-12901
MORRIS, M. N83-12833
MORRIS, M. D. N83-12948
MORRIS, P. J. N83-12968
MORRIS, P. M. N83-12075
MORRISON, G. N. N83-12338
MORROW, J. G. N83-12059
MORTON, R. A. N83-12708
MOSHER, R. L. N83-12888
MOSKOWITZ, S. M. N83-12304
MOSS, M. E. N83-12515
MOTTER, A. D. N83-12566
MPETA, E. J. N83-12739
MUBAYI, V. N83-12558
MUKHERJEE, A. K. N83-12220
MULLEN, E. G. N83-12130
MULLEN, R. L. N83-12300
MUNN, R. E. N83-12601
MURPHY, C. E., JR. N83-12658
MURPHY, L. M. N83-12587
MURRAY, H. N83-12482
MURRAY, J. E. N83-12881
MURRI, W. J. N83-12251
MURTHY, S. N. B. N83-12093
MYERS, R. H. N83-12959
MYRA, J. R. N83-13002
N83-13003

N

NAGAOKA, H. N83-12216
NAGURNEY, M. J. N83-12999
NAKAMURA, Y. N83-12977
NAKANISHI, S. N83-12142
NAKAYAMA, S. N83-12086
NARCISI, R. N83-12191
NASH, W. A. N83-12472
NAZAROV, I. M. N83-12618
N83-12620
NAZAROV, L. N83-12650
NEBELUNG, C. W. N83-12459
NEFF, D. E. N83-12665
N83-12666
NEL, D. G. N83-12954
N83-12955
N83-12957
NEMANICH, R. N83-13021
NETO, G. C. N83-12929
NETO, T. V. N83-12684
N83-12686
NETTLES, M. S. N83-12276
NEUMANN, D. B. N83-12207
NEUMQNN, J. S. N83-12865
NEVATIA, R. N83-12994
NEWKIRK, L. R. N83-12344
NEWMAN, C. K. N83-12512
NEWMAN, J. C., JR. N83-12158
NEWMAN, W. N83-12315
NICKUM, J. D. N83-12299
NIIOKA, T. N83-12139
NIR, M. N83-12849
NISHIMURA, H. N83-12348
NODDIN, E. M. N83-12859
NOGUCHI, M. N83-12522
NOMA, A. A. N83-12898
NORDLI, B. N83-12382
NORMAN, E. B. N83-13043
NORMAN, R. S. N83-12528
N83-12529
NOSAKA, M. N83-12140
NOVIKOV, M. M. N83-12649
NOYES, J. L. N83-12934
NUESCH, D. N83-12500
NYDAHL, J. N83-12390
NYOMARKY, K. M. N83-12637

O

OBENSCHAIN, S. P. N83-12427
OBRIEN, T. K. N83-12152
OCALLAGHAN, F. G. N83-12992
OCHS, G. R. N83-12406
ODOHERTY, R. N83-12567
OEN, O. S. N83-12983
OGUNI, Y. N83-12043
OKAMOTO, M. N83-12996
OKANE, J. M. N83-12854
N83-12855
OLIVIER, E. N83-12686
OLOFSSON, H. N83-13044
OLSON, D. B. N83-12199
OMAN, C. M. N83-12847
ORAN, W. A. N83-12166
ORLANDO, V. A. N83-12066
N83-12067
ORSETTI, W. N83-12211
OSSAKOW, S. I. N83-12695
OSTROMOGILSKY, A. K. N83-12651
OTAWA, T. N83-12788
OTT, L. L. N83-12571
OTTOMEYER, J. D. N83-12075
OUMA, J. P. B. M. N83-12756
OWNBEY, S. N83-12390

P

PACE, M. E. N83-12688
PAGE-SHIPP, R. J. N83-12862
PALUTIKOF, J. P. N83-12745
PAMIDI, P. R. N83-12454
N83-12469
PANOFSKY, H. A. N83-12821
PAPAILIOU, K. D. N83-12363
PAPAVASSILOPOULOS, G. N83-12317
PAPELL, S. S. N83-12360
PARADELLA, W. R. N83-12509
PARADIS, A. R. N83-12066
N83-12067
PARK, J. K. N83-12221
PARKER, J. A. N83-12150
N83-12239
PARKER, V. B. N83-12207
PARTS, L. N83-12560
PASCH, R. J. N83-12727
PASCUCCI, R. F. N83-12713
PASTUKHOV, B. V. N83-12649
PATHAN, J. M. N83-12825
PATNAIK, J. K. N83-12740
PATTEN, S. M. N83-12841
PATTERSON, D. A. N83-12512
PAULON, J. N83-12273
PAULSON, D. N83-12858
PAULSON, J. A. N83-12856
PAWLEWICZ, W. T. N83-12428
PEARMAN, G. I. N83-12676
PEARSON, J. E. N83-12713
PEDERSEN, B. M. N83-12536
PEDGLEY, D. E. N83-12793
PEEBLES, P. Z., JR. N83-12941
PEEL, H. H. N83-12844
N83-12845
PELL, K. N83-12390
PELLETT, G. L. N83-12595
PENN, L. M. N83-12821
PEREIRA, A. E. C. N83-12681
PEREIRA, C. S. N83-12687
N83-12922
PESKIN, A. M. N83-12914
PETERS, C. N83-12497
PETERSEN, E. L. N83-12759
N83-12871
PETERSEN, R. A. N83-12246
PETRENCHUK, O. P. N83-12647
PETROSSIANTS, M. A. N83-12725
N83-12735
PETROV, N. A. N83-12648
PETZOLD, L. B. N83-12946
PFEIFER, H. J. N83-12418
N83-12419
N83-12420
PHELPS, P. J. N83-12371
PHILANDER, G. N83-12731
PHILLION, D. W. N83-12427
PIASECKI, F. N. N83-12099
PICASSO, B. D., III N83-12075
PIENAAR, F. R. P. N83-12478
PIGOTT, K. L N83-12869
PILCHOWSKI, H. U. N83-12124
PILLAI, K. K. N83-12204
PINTER, P. J. N83-12488
PIRKLE, F. L. N83-12512
POKORNEY, J. L. N83-12279
PONS, S. N83-12185
N83-12186
N83-12187
N83-12193
N83-12194
N83-12195
N83-12196
N83-12197
N83-12198
POOLE, F. W. N83-12710
POOR, H. V. N83-12960
POPOV, G. F. N83-12747
PORKOLAB, M. N83-13007
POROIKOVA, A. I. N83-12611
PORT, G. N. J. N83-12602
N83-12617
PORTAT, M. N83-12273
POWELL, J. W. N83-12589

PRASK, H. J. N83-13012
PRATT, V. R. N83-12894
PRATTI, C. S. C. N83-12296
PRESSMAN, A. Y. N83-12618
PRESTON, A. N83-12602
N83-12613
PRICE, K. E. N83-12994
PRICE, R. H. N83-12427
PRICE, S. J. N83-12341
PRILLAMAN, G. H. N83-12276
PRIMAK, W. N83-12987
PROKOFYEV, M. A. N83-12734
PRONO, D. S. N83-13004
PROPHET, W. W. N83-12083
PSALTIS, D. N83-12991
PUCCI, S. L. N83-12048
PUTMAN, W. F. N83-12051
PUTNAM, J. M. N83-12318
N83-12324
N83-12325

Q

QUANG-RIEU, N. N83-13044
QUICK, P. N83-12718
QUISH, E. N83-12058

R

RABITZ, H. N83-12945
RACKLEY, R. A. N83-12088
RADOSEVICH, L. G. N83-12546
RAGHURAM, A. C. N83-12229
RAGHURAMAN, P. N83-12553
N83-12555
N83-12568
N83-12569
RAMACHANDRAN, S. N83-12256
RAMAKRISHNAN, P. N83-12227
N83-12230
RAMAN, S. N83-12223
RAMASAMY, E. N83-12230
RAMOHALLI, K. N83-12237
RANCK, D. N83-12659
RAO, K. R. N83-12990
RAO, V. B. N83-12678
N83-12683
RAPTIS, A. C. N83-12254
RASMUSSEN, J. E. N83-12321
RASPET, R. N83-12974
RAU, T. H. N83-12973
RAUSCH, E. O. N83-12319
RAVISHANKARA, A. R. N83-12183
RAWSON, R. F. N83-12303
RAYMOND, M. N83-12577
READ, M. E. N83-12999
REDDY, B. D. N83-12447
REDNER, R. A. N83-12498
REED, R. J. N83-12728
REHMAN, J. N83-12853
REHMANN, A. J. N83-12298
REIS, J. R. N83-12921
N83-12965
REJZER, A. A. N83-12851
RENNE, D. S. N83-12785
REYNOLDS, L. M. N83-12832
RHIM, W. K. N83-12335
RICE, R. G. N83-12664
RICH, M. J. N83-12071
RICHARDS, B. E. N83-12271
RICHARDS, W. N83-12860
RICHARDSON, A. J. N83-12489
RICHARDSON, J. H. N83-12571
RICHARDSON, M. D. N83-12835
RIEBSAME, W. E. N83-12764
RIEHL, H. N83-12820
RIEKER, A. N83-12198
RIETHMULLER, M. L. N83-12424
RIORDAN, G. A. N83-12402
RIPIN, B. H. N83-12427
RISEBOROUGH, R. W. N83-12638
ROBBEN, F. N83-12385
ROBERTS, A. G. N83-12204
ROBINSON, B. N83-12484
ROBINSON, B. F. N83-12504
ROBINSON, R. S. N83-12259
ROBSON, C. M. N83-12664
RODNE, H. N83-12663
RODRIGUEZ, R. R. N83-12489
ROGERS, D. E. N83-12839
ROGERS, W. H. N83-12859
ROLYA, Y. N83-12643
ROMAN, O. V. N83-12231
RONK, L. A. N83-12040
ROSEN, M. D. N83-12427
ROSENBERG, B. N83-12853
ROSENBLUM, M. N83-13021
ROSENFELD, D. N83-12816
ROSS, W. D. N83-12190
ROSSA, R. J. N83-12082
ROTH, H. N83-12265
ROTH, J. R. N83-13000
ROVINSKY, F. Y. N83-12609
N83-12649
ROWNTREE, P. R. N83-12730
ROYCE, B. S. H. N83-12188
ROYSTER, D. M. N83-12157
RUDE, L. C. N83-12105
RUDEN, T. E. N83-12336
RUMMLER, D. R. N83-12162
RUOFF, C. F. N83-12308
RUSINA, E. N. N83-12609
RUSSELL, M. C. N83-12553
N83-12569
RUSSELL, R. E. N83-12080
RYABOSHAPKO, A. G. N83-12618
RYAN, P. M. N83-12984
RYAN, R. J. N83-12341
RZONCA, L. I. N83-12062

S

SABBAGH, H. A. N83-12442
SABBAGH, L. D. N83-12442
SADOVSKY, E. N83-12643
SAFFMAN, M. N83-12429
SAFFREN, M. M. N83-12335
SAHAI, Y. N83-12596
SAJBEN, M. N83-12052
SAKAKIBARA, S. N83-12043
SALLES, C. E. R. N83-12249
SALTER, L. M. N83-12882
SAMANICH, N. E. N83-12092
SANDERS, F. C. N83-12851
SANDHORN, R. G. N83-12297
SANDUSKY, W. F. N83-12785
SANGER, G. A. N83-12841
SANTANA, C. E. N83-12301
SANTO, C. M. E. N83-12685
SARIN, A. N83-12590
N83-12593
SAROHIA, V. N83-12246
N83-12248
SATO, M. N83-12043
SATYAMURTI, P. N83-12683
SATYAMURTY, P. N83-12721
SAUERMANN, H. B. N83-12289
SAUNDERS, V. R. N83-12985
SAVAGE, R. N83-12075
SAXON, R. P. N83-12979
SCARBROUGH, C. A. N83-12287
SCHAAKE, J. C. N83-12754
SCHARF, L. L. N83-12889
SCHATZINGER, R. A. N83-12708
SCHECHTER, D. E. N83-12984
SCHELL, W. R. N83-12612
SCHENCK, R. N83-12629
SCHEPPELE, S. E. N83-12202
SCHERRER, P. H. N83-13049
SCHLUETER, J. J. N83-12898
SCHMIDT, P. P. N83-12187
SCHMITT, V. N83-12081
SCHMITZ, F. H. N83-12972
SCHNEIDER, D. N83-12841
SCHNEIDER, J. W. N83-12243
SCHOLL, J. W. N83-12072
SCHOLTZ, R. A. N83-12317
SCHOMER, P. D. N83-12974
SCHOPF, P. S. N83-12829
SCHRONK, L. R. N83-12202
SCHUSS, J. J. N83-13007
SCHUSTER, G. B. N83-12189
N83-12192
SCHUYTEMA, G. S. N83-12674
SCHWALB, A. N83-12131
SCHWARTZ, M. N83-12129
SCHWARTZ, R. J. N83-12550
SCHWARZ, F. K. N83-12823
SCHWENDEMANN, M. F. N83-12044
SCOTT, M. H. N83-13005
SCRIBNER, C. F. N83-12474
SEBACH, L. K. N83-12616
SEKER, S. S. N83-12306
SEKINE, S. N83-12086
SELEZNEVA, E. S. N83-12646
SELINGARDI, M. L. N83-12392
SELLA, F. N83-12603
SELLERS, B. N83-12401
SEMEVSKY, F. N. N83-12633
SEMY, K. I. N83-12337
SEMYONOV, S. M. N83-12633
N83-12652
SENADOR, R. N83-12686
SENIOR, T. B. A. N83-12933
SENSER, D. N83-12390
SERAFINI, T. T. N83-12151
SESHADRI, R. N83-12229
SEVRUK, B. N83-12797
N83-12809
SHABAD, L. M. N83-12627
SHACKLETON, M. N83-12667
SHAMPINE, L. F. N83-12951
SHAPIRO, P. N83-12671
SHAPIRO, R. N83-13051
SHARIF, M. N83-12564
SHARMAN, A. P. N83-12311
SHARPE, W. N. N83-12451
SHAW, D. B. N83-12730
SHEBALIN, J. V. N83-12998
SHEFFIELD, R. N83-12891
SHELNUTT, J. B. N83-12083
SHEN, S. S. N83-12487
SHERMAN, F. S. N83-12386
SHIH, T. I. P. N83-12358
SHILINA, A. N83-12650
SHIMURA, T. N83-12140
SHIN, K. G. N83-12868
SHOPAUSKAS, K. K. N83-12628
SHORE, R. A. N83-12310
N83-12323
SHWARTZ, J. N83-12429
SIBENER, S. J. N83-12982
SIDDOWAY, F. H. N83-12492
SIEDLER, G. N83-12731
SIELKEN, R. L., JR. N83-12505
SILVESTER, J. N83-12317
SIMINOV, A. I. N83-12614
SIMMONS, G. M. N83-12256
SIMONICH, D. M. N83-12407
N83-13046
SIMPSON, L. N83-12891
SINNOTT, D. N83-12507
SKALALSKY, B. G. N83-12654
SLATER, P. M. N83-12488
SLEPYAN, E. I. N83-12644
SMIRNOV, N. N. N83-12605
SMITH, A. F. N83-12713
SMITH, C. V. N83-12746
N83-12749
SMITH, D. E. N83-12693
N83-13025
SMITH, F. B. N83-12663
SMITH, G. E. N83-12358
SMITH, H. M. N83-12170
SMITH, H. W. N83-12704
SMITH, J. P. N83-12083
SMITH, R. E. N83-12100
SNELLINGS, I. R. N83-13040
SNYDER, M. H. N83-12531
N83-12532
N83-12533
N83-12534
SNYDER, T. J. N83-12851
SOBRAL, J. H. A. N83-12679
SOHAR, E. N83-12849
SOKOLOV, V. E. N83-12605
SORENSEN, D. C. N83-12905
SOUTHALL, J. W. N83-12073
SPADA, J. A. N83-12670
SPALDING, D. B. N83-12366
N83-12367
N83-12368
N83-12369
N83-12370
N83-12371
SPANGLER, L. W. N83-12595
SPARKS, L. L. N83-12470
SPEARS, J. W. N83-12575
SPEISER, B. N83-12185
N83-12187
N83-12193
N83-12196
N83-12197
N83-12198
SPRANGLE, P. A. N83-12980
SPRINGER, G. S. N83-12358
SRIVATSANGAM, S. N83-12717
ST.CLAIR, T. L. N83-12149
STABLEIN, N. K. N83-12512
STANLICK, E. N83-12916
STANTON, C. P. N83-12903
STAPLES, B. R. N83-12207
STARNES, J. H., JR. N83-12174
STAUB, W. P. N83-12706
STEARNS, C. A. N83-12163

STEFANAKOS, E. K. N83-12562
STEFFEK, D. N83-12189
STEIN, B. A. N83-12156
STEIN, E. N83-12853
STEINWAY, W. J. N83-12283
STEKETEE, E. N83-12470
STEPHENS, J. R. N83-12154
STERN, T. E. N83-12129
STEVENS, J. L. N83-12697
STEWART, W. F. N83-12344
STEYSKAL, H. N83-12310
STIFFLER, J. J. N83-12863
N83-12864
N83-12865
STIRLING, W. L. N83-12984
STOL, I. N83-12438
STOLARSKI, P. N83-12291
STONER, E. R. N83-12504
STOREY, R. W. N83-12595
STRATTAN, L. A. N83-12338
STRAUCH, B. N83-12083
STRAUCH, R. G. N83-12815
STRECKENBACH, J. M. N83-12080
STREET, R. A. N83-13021
STREETT, W. B. N83-12403
STREKOZOV, B. P. N83-12643
STREUFERT, S. N83-12857
STREUFERT, S. C. N83-12857
STRNAT, K. J. N83-12329
STUETZLE, W. N83-12931
N83-12958
STYRO, B. I. N83-12628
SUNDARAM, C. V. N83-12234
SUNDARESAN, R. N83-12229
SUZUKI, M. N83-12140
SYROECHKOVSKY, E. E. N83-12636
SZAMOSSI, M. N83-12077
SZASZ, J. N83-12637
SZECHENYI, E. N83-12273
SZEPESI, D. J. N83-12608

T

TAKAGI, S. N83-12391
TAKAHASHI, M. N83-12139
TAKASE, Y. N83-13007
TAKASHIMA, K. N83-12043
TAKEUCHI, S. N83-12120
TALBOT, L. N83-12385
TALROZE, V. L. N83-12611
TAM, C. K. W. N83-12968
TAMEZ, S. N83-12489
TAMHANKAR, R. V. N83-12228
TAMURA, A. N83-12348
TANAKA, A. N83-12896
TANDBERG-HANSSEN, E. A. N83-13048
TARCZYNSKI, T. N83-12099
TASHKER, M. N83-12064
TASKA, J. N83-13004
TATCHELL, D. G. N83-12371
TAVARES, S. A. N83-12351
TAYLOR, D. M. N83-12042
TAYLOR, J. R. N83-12571
TAYLOR, L. N83-12908
TEICHMAN, L. A. N83-12147
TEIXEIRA, N. R. N83-12596
TELLEFSEN, M. N83-13017
TEMPLE, P. L. N83-12566
TENBRICK, S. C. N83-12916
TENNENBAUM, J. N83-12848
N83-12849
TENNEY, D. R. N83-12165
TEPLITSKAYA, T. A. N83-12649
TERLIZZI, C. P. N83-12287
TEUSCHLER, J. M. N83-12404
TEXTER, S. N83-13007
THELANDER, H. A. N83-12082
THEMELIS, M. P. N83-12570
THOMAS, R. E. N83-12963
THOMAS, W. C. N83-12287
THOMPSON, J. D. N83-12344
THOMPSON, J. R. N83-12632
THOMSON, K. P. B. N83-12508
THORNTON, E. A. N83-12356
THORNTON, J. I. N83-12244
TIGELAAR, H. H. N83-12924
TILLEY, D. G. N83-12326
TIMBARIO, T. J. N83-12255
TISSI, P. N83-12331
TO, W. M. N83-12386
TOAZ, R. D. N83-12246
TODA, N. N83-12522
TOLMIE, D. E. N83-12916
TOMOZAWA, M. N83-12242
TONG, E. T. N83-12458
TORISAKI, T. N83-12086
TORRIERI, D. J. N83-12320
TORTORELLI, P. F. N83-12223
TREAT, N. L. N83-12706
TREXLER, D. T. N83-12584
TRIVEDI, N. B. N83-12685
TROEN, I. N83-12759
TRUNOV, N. M. N83-12645
TSAI, C. C. N83-12984
N83-13021
TSUCHIYA, T. N83-12093
TSUTSUE, M. N83-12592
TSYBAN, A. V. N83-12635
TSYDMIN, P. A. N83-12639
TUBBS, E. F. N83-12991
TUCKER, A. J. N83-12107
N83-12108
TUDE, E. A. P. N83-12328
TULCHINSKAYA, Z. G. N83-12655
TULLY, F. P. N83-12183
TURNER, H. T. N83-12475
TURNER, R. H. N83-12122
TURNER, T. M. N83-12969
TURNER, W. C. N83-13001
N83-13004
TURNOCK, T. J. N83-12062
TURTLE, J. P. N83-12321
TWITCHELL, G. N83-12390
TYLER, N. N83-12708

U

UFFELMAN, D. R. N83-12309
UHRIN, R. N83-13019
UJIHARA, B. H. N83-12458
ULABY, F. T. N83-12485
N83-12499
N83-12503
UNDERWOOD, J. H. N83-12218
UPADHYAYA, G. S. N83-12233
UY, C. F. N83-12982
UZUNOV, B. N83-12622

V

VALE, C. D. N83-12870
VALENCIA, F. A. N83-12344
VANDENBROECK, J. M. N83-12942
VANDERMEE, C. V. M. N83-12925
VANDERMERWE, A. J. N83-12954
VANDERMERWE, C. A. N83-12954
VANNUCCI, R. D. N83-12175
VANZYL, J. M. N83-12952
VARY, A. N83-12168
VEGLIA, A. N83-12962
VELASCO, F. R. D. N83-12883
VENKATARAMAN, N. S. N83-12126
N83-12351
VERMA, A. K. N83-12355
VESELY, E. J., JR. N83-12215
VIJAYKUMAR, N. L. N83-12681
VIRCHENKO, E. N83-12650
VISWANADHAM, Y. N83-12694
VITORELLO, I. N83-12509
VOLBERG, N. S. N83-12655
VOLKOV, Y. A. N83-12733
VONGLAHN, U. N83-12966
VORONOVA, L. D. N83-12642
VORONTSOV, A. I. N83-12609
VUKOVICH, F. N83-12814

W

WADLINGER, E. A. N83-12908
WAITE, W. P. N83-12491
WALDRON, K. J. N83-13039
WALDRON, R. D. N83-12109
WALKER, R. W. N83-12184
WALLACE, D. R. N83-12457
WALLEN, C. C. N83-12603
WALTER, H. N83-12489
WALTON, J. R. N83-12178
WANG, C. R. N83-12360
WANG, C. S. N83-13016
WANG, H. N83-12631
WANG, J. Y. N83-12884
WARD, M. N83-12451
WARD, S. H. N83-12450
WARN-VARNAS, A. N83-12833
WARNER, J. S. N83-12252
WASHINGTON, W. M. N83-12812
WAT, J. N83-12248
WATANABE, M. N83-12140
WATANABE, Y. N83-12140
WATKINS, C. N83-12826
WATSON, R. W. N83-12886
WATTS, H. A. N83-12904
WECHSLER, M. S. N83-12226
WEIHE, W. H. N83-12761
WEINGART, J. N83-12558
WEIS, P. N83-12565
WEISE, B. R. N83-12708
WEISLOGEL, G. S. N83-12046
WEISMILLER, R. A. N83-12504
WELCH, J. D. N83-12066
N83-12067
WELCH, K. M. N83-12563
N83-12585
WETZEL, P. E. N83-12538
N83-12540
WHALEY, K. B. N83-12982
WHELPDALE, D. M. N83-12663
WHITAKER, C. N83-12556
WHITE, E. R. N83-12049
WHITE, R. N83-12592
WHITLOCK, R. R. N83-12427
WHITTENBERGER, J. D. N83-12176
WICHER, J. N83-12236
WIDMAN, D. H. N83-12915
WIDROW, B. N83-12315
WIEHL, H. J. N83-13047
WIESE, M. R. N83-12523
WIETING, A. R. N83-12356
WIGLEY, T. M. L. N83-12745
WILHELM, D. R. N83-12474
WILKENFELD, J. M. N83-12136
N83-12137
WILKINSON, W. S. N83-12040
WILLIAMS, G. N83-12820
WILLIAMS, J. E. F. N83-12976
WILLIAMS, J. G. N83-12174
WILLIAMS, J. M. N83-12223
WILLS, W. P. N83-12101
WILLSON, W. G. N83-12201
WILSON, D. E. N83-12383
WILSON, R. G. N83-13022
WILSON, T. N83-12944
WILSON, W. S. N83-12245
WININGER, M. T. N83-12190
WLODYKA, L. N83-12191
WOLD, A. N83-13017
WOLF, D. A. N83-12525
WOLFSON, R. G. N83-13013
WOOD, D. O. N83-12591
WOODBURY, W. N83-12895
WRIGHT, L. A. N83-12981
WU, Y. C. L. N83-13005
WYNHOLDS, H. N83-12565

Y

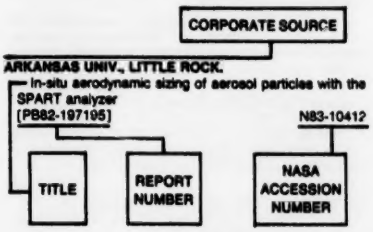
YAMADA, H. N83-12140
YAMAKAWA, K. A. N83-12986
YAMANA, M. N83-12592
YAMANAKA, T. N83-12121
YAMAZAKI, K. N83-12996
N83-12997
YAMAZAKI, Y. N83-12721
YAO, J. T. N83-12286
YATSUYANAGI, N. N83-12346
YAU, J. F. N83-12451
YEE, C. L. N83-12999
YEOH, C. C. N83-12350
YEUNG, J. A. N83-12991
YOSHIDA, A. N83-12086
YOSHIMURA, S. N83-12121
YOSSIMI, M. N83-12392
YOUNG, D. K. N83-12835
YOUNG, D. R. N83-12638
YOUNG, J. B. N83-12349
N83-12350
YOUNG, T. C. N83-12657
YU, S. S. N83-12947
YUE, G. K. N83-12682
YURA, J. A. N83-12477

Z

ZAFRAN, S. N83-12144
N83-12145
ZALESAK, S. T. N83-12695
ZAUGG, P. N83-12561
ZERWEKH, P. S. N83-12397
ZESCH, J. N83-13021
ZIDEK, J. V. N83-12952
ZIER, M. N83-12621
ZIMMERMAN, R. M. N83-12705
ZOHAR, E. N83-12848

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES OF THE LATVIAN SSR, RIGA.
Study of pollutant impact on freshwater ecosystems N83-12639

ACADEMY OF SCIENCES OF THE LITHUANIAN SSR, VILNIUS.
On the mechanisms of the deposition of atmospheric admixtures to the ground surface N83-12628

ACADEMY OF SCIENCES (USSR), IRKUTSK.
On some pecularities of diffusion models in inhomogeneneous merlia N83-12653

ACADEMY OF SCIENCES (USSR), MOSCOW.
Monitoring of the biosphere biological component N83-12605
Ozone problem in connection with monitoring the state of the atmosphere N83-12611
Study of pollutant migration and transformation N83-12623
Cycles of heavy metal migration in ecosystems of the Sikhote-Alin biospheric region N83-12641
A study of volatility, content dynamics and transformation of priority pollutants in atmospheric and aquatic environments N83-12643
Developmental defects of plants as tests in monitoring environmental pollution N83-12644
Theoretical studies of tropical waves N83-12729
Boundary layer phenomena: (1) The surface layer (air-sea interaction and its parameterization); (2) the structure of the atmospheric boundary layer under different convective conditions N83-12733
Radiation processes and their parameterization N83-12734

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Measurement of high-temperature high-pressure processes: A summary report
[PB82-196932] N83-12667

AEROCHEM RESEARCH LABS., INC., PRINCETON, N. J.
Soot formation in synfuels
[DE82-004271] N83-12199

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Hazards of colour coding in visual approach slope indicators
[ARL-SYS-REPORT-25] N83-12057
Computer graphic presentation of conventional cockpit instruments
[ARL-SYS-NOTE-82] N83-12082
A general program for predicting rigid-aircraft gust response
[ARL-AERO-NOTE-407] N83-12097
Stress analysis of adhesively bonded repairs to fibre composite structures
[ARL-STRUC-REPORT-386] N83-12172

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
USAF bioenvironmental noise data handbook. Volume 172: Hush-noise suppressor (Aero Systems Engineering, Incorporated) far-field noise
[AD-A118773] N83-12973

AGRICULTURAL RESEARCH SERVICE, MANHATTAN, KANS.
Darrieus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] N83-12564

AGRICULTURAL RESEARCH SERVICE, PHOENIX, ARIZ.
Discrimination of growth and water stress in wheat by various vegetation indices through a clear a turbid atmosphere
[E83-10009] N83-12488

AGRICULTURAL RESEARCH SERVICE, PULLMAN, WASH.
Influence of environmental factors during seed development and after full-ripeness on pre-harvest sprouting in wheat
[E83-10002] N83-12482

AIR FORCE ACADEMY, COLO.
Measurement of wake interactions of a canard and a forward swept wing
[AD-A118756] N83-12053

AIR FORCE AERO PROPULSION LAB., WRIGHT-PATTERSON AFB, OHIO.
Problems of measurement of dynamic wall pressures N83-12263
Application of strain gauges and thermocouples to rotating and stationary hardware N83-12266
Signal transmission via sliprings and telemetry N83-12267

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
Air Weather Service (AWS) climatic briefs: North America
[AD-A118448] N83-12766
Mather AFB, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F
[AD-A118461] N83-12767
Air Weather Service (AWS) climatic briefs: Latin America
[AD-A118449] N83-12769
Youngstown MAP, Ohio. Revised Uniform Summary of Surface Wether Observations (RUSSWO), Parts A-F
[AD-A118509] N83-12770
Seattle Tacoma IAP, Washington. Revised Unifrom Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118508] N83-12771
Bitburg Air Base, West Germany. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118507] N83-12772
Natrona County/Casper, Wyoming. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118506] N83-12773
Daggett Municipal, California. Revised Uniform Summary of Surface Weather Observations (RUSSWO), Parts A-F
[AD-A118505] N83-12774
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Osan AB, Korea
[AD-A118472] N83-12775
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Parts A-F: Albany County APT, New York
[AD-A118471] N83-12776
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Fort Know/Godman AAF, Kentucky, parts A-F
[AD-A118462] N83-12777
Revised Uniform Summary of Surface Weather Observations (RUSSWO). Wurtsmith AFB, Mich., Parts A-F
[AD-A118510] N83-12780

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
High-level spacecraft charging environments near geosynchronous orbit
[AD-A118791] N83-12130
Development of an ion mass spectrometer and sounding rocket system for D-region cluster-ion measurements
[AD-A118752] N83-12191
Data transmitters and command receiver development
[AD-A118739] N83-12322
Sonde experiments for comparative measurements of optical turbulence
[AD-A118740] N83-12699
The statistical relations among Q, Kp, and the Global Weather Central -K indices
[AD-A118734] N83-12700
A climatological study of the AFGL mesonetwork, volume 1
[AD-A118786] N83-12768
Climatic probabilities of the vertical distribution of cloud cover
[AD-A118753] N83-12778
Improved cloud detection utilizing defense meteorological satellite program near infrared measurements
[AD-A118751] N83-12779
The B-G system of evaluating forecasts
[AD-A118735] N83-12782
Cirrus particle distribution study, part 8
[AD-A118715] N83-12783

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
A new capability fo elastic aircraft airloads via NASTRAN N83-12464

AIR FORCE SPACE DIV., LOS ANGELES, CALIF.
Draft supplement to final environmental impact statement, Space Shuttle program, Vandenberg AFB, California N83-12598

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Soviet mathematical programming
[AD-A116970] N83-12934
A survey of mathematical programming in the Soviet Union
[AD-A116969] N83-12935

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Instructions for TI-59 combined card/module calculations for in-plane and flexural properties of symmetric laminates: Revised
[AD-A117869] N83-12471

AIRCRAFT RESEARCH ASSOCIATION LTD., BEDFORD (ENGLAND).
The computation of transonic potential flow N83-12379

AIRESEARCH CASTING CO., TORRANCE, CALIF.
Cast Fe-base cylinder/regenerator housing alloy
[NASA-CR-169474] N83-12214

AIRESEARCH MFG. CO., PHOENIX, ARIZ.
Advanced Gas Turbine (AGT) powertrain system development program
[NASA-CR-169475] N83-12088

AKADEMIYA MEDITSINSKIKH NAUK SSSR, MOSCOW.
Input of chemical carcinogens Polycyclic Aromatic Hydrocarbons (PAH) to the atmosphere and their circulation in the environment N83-12627

ALBERTA UNIV., EDMONTON.
Orthogonal collocation simulation of the rotating disc electrode
[AD-A118712] N83-12185
Vibrational spectroscopy of the electrode-solution interphase. 2. Use of FTIR spectroscopy for recording IR spectra of radical ion intermediates
[AD-A118705] N83-12186
Simulation of the dropping mercury electrode by orthogonal collocation
[AD-A118689] N83-12187
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 1. Two dimensional collocation and theory for chronoamperometry
[AD-A118708] N83-12193

Vibrational spectroscopy of the electrode-solution interphase. 3: Use of FTIR spectroscopy for observing double layer reorganization
[AD-A118706] N83-12194
Vibrational spectroscopy of the electrode-solution interphase. 4: FTIR - experimental considerations
[AD-A118707] N83-12195
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 2: The theory for cyclic voltammetry by collocation
[AD-A118709] N83-12196
Simulation of edge effects in electroanalytical experiments by orthogonal collocation. Part 3: Application to chronoamperometric experiments
[AD-A118710] N83-12197
Electroanalytical investigations. Part 4: Use of orthogonal collocation for the simulation of quasireversible electrode processes under potential scan conditions
[AD-A118711] N83-12198

AMERICAN AIRLINES, INC., EULESS, TEX.
Definition of Alaskan Aviation training requirements
N83-12852

AMES LAB., IOWA.
Shape-memory resistivity behavior of transformation-fatigue-cycled nickel-titanium wires near the equiatomic composition
[DE82-018272] N83-12226

ANALYTICS, INC., BLOOMINGTON, IND.
Development of a system to invert eddy-current data and reconstruct flaws
[AD-A118767] N83-12442

ANSER ANALYTIC SERVICES, INC., ARLINGTON, VA.
Evaluation of the medical information system at the the NIH Clinical Center
[PB82-190083] N83-13029
Evaluation of the medical information system at the NIH Clinical Center. Volume 2: Appendices on detailed functional performance and conduct of research
[PB82-190091] N83-13030
Evaluation of the medical information system at the NIH Clinical Center. Volume 3: Appendix on technical performance
[PB82-190109] N83-13031
Evaluation of the medical information system at the NIH Clinical Center. Volume 4: Appendix on cost-benefit analysis
[PB82-190117] N83-13032
Evaluation of the medical information system at the NIH Clinical Center. Volume 5: Appendices on surveys
[PB82-190125] N83-13033
Evaluation of the medical information system at the NIH Clinical Center. Volume 6: Appendices on data collection
[PB82-190133] N83-13034

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
System calibration strategies for spaceborne synthetic aperture radar
[PB82-182502] N83-12326
Annotated atlas of H-alpha synoptic charts
[AD-A118170] N83-13053

ARGONNE NATIONAL LAB., ILL.
Materials technology for coal-conversion processes
[DE82-004036] N83-12253
State-of-the-art of acoustic instrumentation for coal-conversion plants
[DE82-004037] N83-12254
Development of enhanced heat transfer/transport/storage slurries for thermal-system improvement
[DE82-021236] N83-12387
Annual synopsis of Argonne's aqueous battery support research, fiscal year 1981
[DE82-021143] N83-12583
Guidelines for using the AMDLIB, IMSL and NAG mathematical software libraries at ANL
[ANL-81-73] N83-12884
Computing a trust region step
[DE82-005656] N83-12905
Radiation damage in diagnostic window materials for the TFTR
[ANL-FFP-TM-146] N83-12987

ARKANSAS UNIV., FAYETTEVILLE.
Measurement of soil moisture using remote sensing multisensor radiation techniques
[E83-10012] N83-12491

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
The correlation of nitrocellulose properties and cellulose feedstock crystal structure
[AD-A118677] N83-13012

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
A single specimen J-based fracture toughness test for high strength steels
[AD-A118674] N83-12218
Improved electrodeposited low contraction chromium
[AD-A118678] N83-12219
On elastic-plastic analysis of an overloaded breech ring using NASTRAN N83-12462

ARMY AVIATION ENGINEERING FLIGHT ACTIVITY, EDWARDS AFB, CALIF.
Airworthiness and flight characteristics test. Part 1: YAH-64 advanced attack helicopter
[AD-A118490] N83-12075

ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, MOFFETT FIELD, CALIF.
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data
[NASA-TM-84245-VOL-2] N83-12048

ARMY CONSTRUCTION ENGINEERING RESEARCH LAB., CHAMPAIGN, ILL.
Operational noise data for UH-60A and CH-47C Army helicopter
[AD-A118796] N83-12974

ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Users guide: Computer program for bearing capacity analyses of shallow foundations (CBEAR)
[AD-A118487] N83-12888

ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND, ADELPHI, MD.
Frequency hopping, multiple frequency-shift keying, coding, and optimal partial-band jamming
[AD-A118585] N83-12320

ARMY MEDICAL BIOENGINEERING RESEARCH AND DEVELOPMENT LAB., FORT DETRICK, MD.
Anaerobic digestion of lime sludge
[AD-A118502] N83-12656

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
Verification tests of the Lectra Motors Corporation Lectra 2+2
[AD-A118718] N83-13040

ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
A note on the general scaling of helicopter blade-vortex interaction noise
[AD-A118761] N83-12972

ARMY RESEARCH INST. FOR THE BEHAVIORAL AND SOCIAL SCIENCES, ALEXANDRIA, VA.
Research Issues in the Determination of Simulator Fidelity: Proceedings of the ARI sponsored Workshop
[AD-A118253] N83-12106

ARMY WAR COLL., CARLISLE BARRACKS, PA.
A data reduction package for US Army Topographic computers: Hand-held programmable calculators
[AD-A118854] N83-12902

ARO, INC., ARNOLD AIR FORCE STATION, TENN.
The 1981 calibration of the AEDC-PWT aerodynamic wind tunnel (4T) at Mach numbers from 0.1 to 1.3
[AD-A118704] N83-12104

ASSESSMENT SYSTEMS CORP., ST. PAUL, MINN.
Development of a microcomputer based adaptive testing system. Phase 1: Specification of requirements and preliminary design
[AD-A118822] N83-12870

ASSISTANT SECRETARY OF DEFENSE (INTELLIGENCE), WASHINGTON, D. C.
Modernization of the WWMCCS Information System (WIS). Executive summary and main report
[AD-A118784] N83-12314

ASSOCIATION AERONAUTIQUE ET ASTRONAUTIQUE DE FRANCE, PARIS.
Aerodynamics on a transport aircraft type wing-body mode
[PB82-206855] N83-12081
Noise source mechanisms in unsteady flow
[PB82-203837] N83-12976

AUBURN UNIV., ALA.
Allocating R&D resources: A study of the determinants of R&D by character of use
[PB82-193343] N83-13026

AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
Stevens Home, Rancho Santa Fe, California: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021698] N83-12538
Kalin Home, Long Island, New York: Solar-energy-system performance evaluation, Sep. 1981-Mar. 1982
[DE82-021701] N83-12539
EROS Data Center, Sioux Falls, South Dakota: Solar-energy-system performance evaluation, Oct. 1981 - Apr. 1982
[DE82-021703] N83-12540
Williamson Home, Ipswich, Mass. solar-energy-system performance evaluation, Nov. 1981 - Apr. 1982
[DE82-021300] N83-12574
Lo-Cal, Champaign, Illinois solar-energy-system performance evaluation, Jan. 1982 - Apr. 1982
[DE82-021299] N83-12575
Isakson Home, Anoka, Minnesota solar-energy-system performance evaluation, Aug. 1981 - Mar. 1982
[DE82-021297] N83-12576
Karasek Home, Blackstone, Massachusetts solar-energy-system performance evaluation, Nov. 1981 - Mar. 1982
[DE82-021302] N83-12577
Environmental partnership, Cream Ridge, New Jersey: Solar-energy-system performance evaluation, October 1981 through March 1982
[DE82-021303] N83-12579
Telluride School, Telluride, Colorado solar-energy-system performance evaluation, February 1982 - April 1982 N83-12585
Wood Road School, Ballston Spa, New York solar-energy-system performance evaluation, November 1981 - April 1982
[DE82-021301] N83-12586
July 1982 environmental data for sites in the National Solar Data Network
[DE82-021702] N83-12787

AUTOMETRIC CORP., INC., FALLS CHURCH, VA.
Determination of the contribution of side-looking airborne radar to structural geologic mapping
[PB82-185042] N83-12713

B

BATTELLE COLUMBUS LABS., OHIO.
Analytical techniques for aromatic components in aircraft fuels
[AD-A118838] N83-12252

BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
Uncertainty analysis
[DE82-020058] N83-12963

BEDFORD INST. OF OCEANOGRAPHY, DARTMOUTH (NOVA SCOTIA).
Background levels and environmental cycling of petroleum hydrocarbons: Multimedia monitoring requirements N83-12630

BENDIX CORP., KANSAS CITY, MO.
Stress relaxation of cellular silicone material: 1982
[DE82-020115] N83-12243
Universal tooling for the Davis and Wilder model 1033 split cylindrical chamber vacuum-deposition system
[DE82-020364] N83-12281
Computer-aided process preparation for printed wiring boards
[DE82-004522] N83-12343
Use of Freon for in-place filter testing
[DE82-008030] N83-12660
Properties of the Wilson-Fowler spline
[DE82-020106] N83-12949

BENDIX FIELD ENGINEERING CORP., GRAND JUNCTION, COLO.
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512

BETTIS ATOMIC POWER LAB., PITTSBURGH, PA.
Metallographic standards for estimating hydrogen content of Zircaloy-4 tubing (LWBR development program)
[PB82-022074] N83-12225

BHABHA ATOMIC RESEARCH CENTRE, BOMBAY (INDIA).
Preparation of zirconium-nickel alloy by powder metallurgy N83-12232
The powder metallurgy of rare earth-cobalt permanent magnets N83-12234

BOEING AEROSPACE CO., HOUSTON, TEX.
Sneak analysis application guidelines
[AD-A118479] N83-12887

BOEING AEROSPACE CO., SEATTLE, WASH.
Design, fabrication and test of graphite/polyimide composite joints and attachments
[NASA-CR-165955] N83-12450

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Development of Integrated Programs for Aerospace-vehicle design (IPAD): Integrated information processing requirements
[NASA-CR-2984] N83-12073
Aircraft noise reduction
[PB82-206095] N83-12080

BORG-WARNER CORP., LOS ANGELES, CALIF.
Solar-energy-system performance evaluation, Cathedral Square, Burlington, Vermont, July - December 1981
[DE82-016999] N83-12563

BOSTON COLL., CHESTNUT HILL, MASS.
Atmospheric density models, including tides
[AD-A118723] N83-12701

BRIDGEPORT UNIV., CONN.
An interactive review system for NASTRAN
N83-12456

BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
Stereophonic and two channel sound in terrestrial television broadcasting
[BBC-RD-1982/18] N83-12292
The introduction of mixed polarization for vhf sound broadcasting: The Wrotham installation
[BBC-RD-1982/17] N83-12293

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Population hazards resulting from the combustion of fossil fuels and the nuclear power industry
[BLL-RISLEY-TR-4173-(9091.9F)] N83-12594

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558
Traditional computing center as a modern network node
[DE82-006935] N83-12914

BROWN BOVERI CORP., NORTH BRUNSWICK, N.J.
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design
[DE82-019781] N83-12561

BROWN, BOVERIE UND CIE, A.G. BADEN (SWITZERLAND).
Vibration and clearance measurements on rotating blades using stationary probes N83-12265
Instrumentation for LDA signal processing
N83-12421
Particle behaviour in flows and suitable particles for LDA measurements N83-12422
Further developments in laser anemometry
N83-12423

BROWN UNIV., PROVIDENCE, R. I.
The dependence of magnetic properties on structure in the system Fe2Ge(x)Si(1-x)04
[AD-A118467] N83-13017

BUDAPEST SCIENCE UNIV. (HUNGARY).
A new method for study of injurious effect of dust pollution on leaves N83-12637

BUREAU OF MINES, DENVER, COLO.
Rock mechanics investigation of two bed trona mining, Green River, Wyoming
[PB82-177312] N83-12709

BUREAU OF MINES, PITTSBURGH, PA.
The theory of flammability limits. Radiative losses and selective diffusional demixing
[PB82-193178] N83-12205

BUREAU OF RECLAMATION, DENVER, COLO.
Project Skywater data inventory: 1980 - 1981 SCPP season, Sierra Cooperative Pilot Project
[PB82-185174] N83-12819

C

CALIFORNIA UNIV., BERKELEY.
Paint solubility testing
[PB82-177049] N83-12244
Applications of Rayleigh scattering to turbulent flows with heat transfer and combustion
[AD-A118576] N83-12385
Investigation of free-forced convection flows in cavity-type receivers
[DE82-020118] N83-12386

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Technology-base research project for electrochemical storage report for 1981
[DE82-020599] N83-12573
Bioassay studies to determine OTECs effect on phytoplankton activity
[DE82-021316] N83-12661

CALIFORNIA UNIV., BODEGA BAY.
Changes in the levels of DDE and polychlorinted biphenyl (PCB) contamination of California coastal waters, 1971 - 1977: Use of the mussel, Mytilus californianus, as an indicator species N83-12638

CALIFORNIA UNIV., DAVIS.
Fundamental investigations of superplastic forming processes
[AD-A118614] N83-12220

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
GAMIDEN: A program to aid in the identification of unknown materials by gamma-ray spectroscopy
[DE82-021960] N83-12203
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
Fluidized-bed pyrolysis of oil shale: Oil yield, composition, and kinetics
[DE82-021010] N83-12571
Is the two-term expansion valid for highly anisotropic systems. The Townsend ionization coefficient in strong runaway as a test case
[DE82-020362] N83-12947
Plasma parameter measurements using neutral-particle-beam attenuation
[DE82-021120] N83-13001
Experimental observations and model calculations of impurity radiation in a plasma gun compact torus experiment
[DE82-020365] N83-13004

CALIFORNIA UNIV., LOS ANGELES.
Fundamental investigation of the retrogression and reaging (RRA) of commercial Al-base alloys its effect on stress corrosion cracking
[AD-A118553] N83-12221
Effect of molybdenum plus chromium on the corrosion of iron-, nickel-, and cobalt-base alloys in basaltic lava and simulated magmatic gas at 11500C
[DE82-021127] N83-12224

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Lateral flying qualities of highly augmented fighter aircraft, volume 2
[AD-A118071] N83-12100

CAMBRIDGE UNIV. (ENGLAND).
Critical conditions and the choking mass flowrate in non-equilibrium wet steam flows
[CUED/A-TURBO/TR-113] N83-12349
Non-equilibrium throughflow analyses of low pressure, wet steam turbines
[CUED/A-TURBO/TR-116] N83-12350

CAPE TOWN UNIV. (SOUTH AFRICA).
An evaluation of the inelastic behaviour of two degree of freedom structures under earthquake loading
[TR-9] N83-12258
Virtual work, material inequalities and variational principles in structural mechanics
[TR-10] N83-12445
Some comments on convergence onto mode form solutions in impulsively loaded piecewise linear rigid-plastic structures
[TR-11] N83-12446
Surface instabilities on an equibiaxially stretched elastic half-space
[TR-7] N83-12447
Geometrically nonlinear mode approximations for impulsively loaded homogeneous viscous beams and frames
[TR-6] N83-12448

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Orientation dependence of the stress rupture properties of Nickel-base superalloy single crystals
[NASA-CR-165394] N83-13009

CENTRE D'ETUDES ET DE RECHERCHES, TOULOUSE (FRANCE).
Turbulence modelling and boundary layer calculation methods N83-12364

CENTRE METEOROLOGIQUE DE GENEVE (SWITZERLAND).
Objective forecasting of the heights of precipitation and of relative insolation by means of discriminatory analysis
[REPT-44] N83-12716

CESSNA AIRCRAFT CO., WICHITA, KANS.
Application of advanced technologies to small, short-haul transport aircraft (STAT)
[NASA-CR-152362] N83-12072

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
High sensitivity molecular line observations of IRC+10216
[PB82-187220] N83-13044

CHICAGO UNIV., ILL.
Rotationally mediated selective adsorption as a probe of isotropic and anisotropic molecule. Surface interaction potentials: HD(J)/Ag(111)
[AD-A118789] N83-12982

CINCINNATI UNIV., OHIO.
Three dimensional flow computations in a turbine scroll
[NASA-CR-168003] N83-12045
Notes on coordinate generation: Fundamental ideas
N83-12376
Notes on numerical methods for coordinate generation based on a mapping technique N83-12377
The continuous flow analyzer automation system. Part 1: Functional specifications
[PB82-191081] N83-12404

CIVIL AERONAUTICS BOARD, WASHINGTON, D.C.
Area equivalent method: A quick procedure for determining noise impact at civilian airports
[PB82-195892] N83-12975

CLARK UNIV., WORCESTER, MASS.
Assessing the impact of climate on society: A research review N83-12764

CLARKSON COLL. OF TECHNOLOGY, POTSDAM, N.Y.
Effects of anaerobic conditions on availability of particulate phosphorus from tributaries to Lake Erie
[AD-A118274] N83-12657

COATES (JOSEPH F.), INC., WASHINGTON, D.C.
The consequences of metric production for small manufacturers. Volume 2: Case studies of large business-small business interactions
[AD-A118634] N83-12276
The consequences of metric conversion for small manufacturers. Volume 1: Summary report
[AD-A118633] N83-12277
Metric use in the tool industry. A status report and a test of assessment methodology
[AD-A118632] N83-12278

COLORADO DIV. OF HIGHWAYS, DENVER.
Data collection and analysis for geothermal research
[PB82-185430] N83-12390

COLORADO DIV. OF WATER RESOURCES, DENVER.
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519

COLORADO STATE UNIV., FORT COLLINS.
Industrial ion source technology
[NASA-CR-159877] N83-12259
The behavior of LNG vapor clouds: Wind-tunnel simulation of 40 M3 LNG spill tests at China Lake Naval Weapons Center, California
[PB82-199027] N83-12665
LNG plume interaction with surface obstacles
[PB82-198995] N83-12666
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889

COLUMBIA UNIV., NEW YORK.
Next generation communications satellites: multiple access and network studies
[NASA-CR-167903] N83-12129

COMARCO, INC., ANAHEIM, CALIF.
Computer Aided Mission Planning System (CAMPS)
[AD-A118567] N83-12895

COMMISSARIAT A L'ENERGIE ATOMIQUE, SACLAY (FRANCE).
Possibility of detecting the nuclear gamma line at 6.13 MeV of atmospheric and cosmic origin O(16)
[INPE-2511-PRE/190] N83-12684

COMMITTEE ON GOVERNMENTAL AFFAIRS (U. S. SENATE).
Energy conservation strategy for the 1980's
[GPO-86-217] N83-12521

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION, MELBOURNE (AUSTRALIA).
Description of a one dimensional global carbon cycle model
[CSIRO-TECHNICAL-PAPER-42] N83-12676

COMPUTER SCIENCES CORP., EL SEGUNDO, CALIF.
Recent improvements and enhancements to NASTRAN N83-12454
On restarts in NASTRAN N83-12469

COMPUTER SCIENCES CORP., HAMPTON, VA.
An analysis of thermal response factors and how to reduce their computational time requirement
[NASA-CR-165992] N83-12523

COMPUTER SCIENCES CORP., MOUNTAIN VIEW, CALIF.
Thumb actuated two axis controller
[NASA-CASE-ARC-11372-1] N83-12098

COMSIS CORP., MOUNTAIN VIEW, CALIF.
ARTS 2A design analysis
[FAA-RD-82-54] N83-12064

COOK INLET REGION, INC., SAN FRANCISCO, CALIF.
Coal to methanol feasibility study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542

CORNELL UNIV., ITHACA, N. Y.
Heat of mixing apparatus for liquefied gases
[PB82-195645] N83-12403
Autoheated, aerobic, thermophilic digestion of municipal sludge with air aeration
[PB82-196908] N83-12670

COUNCIL ON ENVIRONMENTAL QUALITY, WASHINGTON, D.C.
Use of river basin water quality monitoring data to analyze heavy metal input to the marine environment
N83-12625

COUNTY OF DELAWARE, MEDIA, PA.
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
CRANFIELD INST. OF TECH., BEDFORDSHIRE (ENGLAND).
Introduction to laser anemometry studies in turbomachinery N83-12268
Analysis of laser Doppler anemometer data arising from high speed turbomachinery studies N83-12269
Initial findings during studies of the flow within a high speed impeller using a transit anemometer N83-12270

D

DAR-ES-SALAAM UNIV. (TANZANIA).
Climatological aspects of human settlements in Africa N83-12762
DAYTON UNIV., OHIO.
Characteristics of high performance ejectors
[AD-A118720] N83-12095
Testing of the permanent magnet material Mn-Al-C for potential use in propulsion motors for electric vehicles
[NASA-CR-169481] N83-12329
DEFENCE RESEARCH ESTABLISHMENT, OTTAWA. (ONTARIO).
Measurement of the combined heat and water-vapour flow through clothing under transient conditions
[AD-A118804] N83-12382
DEFENSE MAPPING AGENCY AEROSPACE CENTER, ST. LOUIS, MO.
Charting utilization requirements for a digital cartographic data base
[AD-A118455] N83-12510
DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER, WASHINGTON, D.C.
Software for three dimensional topographic sciences
[AD-A118465] N83-12898
DELAWARE UNIV., NEWARK.
Wave spectral transformation in shallow water
[AD-A118496] N83-12831
DEPARTMENT OF AGRICULTURE, COLUMBIA, MO.
Second generation crop yield models review
[E83-10003] N83-12483
DEPARTMENT OF AGRICULTURE, HOUSTON, TEX.
Optical parameters of leaves of seven weed species
[E83-10010] N83-12489
DEPARTMENT OF AGRICULTURE, SYDNEY, MONT.
Winter wheat stand density determination and yield estimates from handheld and airborne scanners
[E83-10013] N83-12492
DEPARTMENT OF AGRICULTURE AND FISHERIES FOR SCOTLAND, ABERDEEN.
Progress in the study of contamination effects in the marine environment N83-12615
DEPARTMENT OF ENERGY, BARTLESVILLE, OKLA.
Automated probe microdistillation/mass spectrometry for the analysis of high-molecular weight compounds in fossil fuels
[PB82-022039] N83-12202
DEPARTMENT OF ENERGY, GRAND FORKS, N. DAK.
Liquefaction behavior of an Australian brown coal in comparison to that of two US lignites
[DE82-021977] N83-12201
DEPARTMENT OF ENERGY, PORTLAND, OREG.
Solar home show: Homes designed for the solar homebuilders program
[DE82-020255] N83-12557
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Summary outline of DOE geoscience and geoscience related research
[DE82-008203] N83-12480
Secretary's report to Congress. Secretary's statement, program review and outlook
[DE82-021878] N83-12581
DEPARTMENT OF LANDS, VALUATION AND WATER, LILONGWE (MALAWI).
The importance of climate change on the water balance of Lake Malawi N83-12757
DEPARTMENT OF THE ENVIRONMENT, LONDON (ENGLAND).
Integrated global monitoring of the environment: Practical considerations N83-12617
DESMATICS, INC., STATE COLLEGE, PA.
Data integration: Combining real-world and simulation data
[AD-A118245] N83-13025
DETROIT DIESEL ALLISON, INDIANAPOLIS, IND.
Components for digitally controlled aircraft engines
[NASA-CR-165296] N83-12089
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165178] N83-12431
DIRECTION DE LA METEOROLOGIE NATIONALE, PARIS (FRANCE).
Possibility of determining drought probability and using it in decision making N83-12738
DISTRICT OF COLUMBIA UNIV., WASHINGTON, D. C.
A neurobehavioral study of rats using a model perfluorinated acid, NDFDA
[AD-A118560] N83-12843
DOUGLAS AIRCRAFT CO., INC., LONG BEACH, CALIF.
Calculation of compressible flow in and about three-dimensional inlets with and without auxiliary inlets by a higher-order panel method
[NASA-CR-168009] N83-12047
DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Exchange of carbon dioxide between a forest and the atmosphere
[DE82-020061] N83-12658

E

EAST ANGLIA UNIV., NORWICH (ENGLAND).
Strategies for the amelioration of agricultural drought in Africa N83-12745
ELECTROMAGNETIC COMPATIBILITY ANALYSIS CENTER, ANNAPOLIS, MD.
EMC analysis of a prototype civil use GPS receiver on four aircraft configurations
[ECAC-CR-82-048] N83-12300
EMBRY-RIDDLE AERONAUTICAL UNIV., DAYTONA BEACH, FLA.
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083
Pilot judgment training and evaluation, volume 1
[AD-A117508] N83-12854
Pilot judgment training and evaluation, volume 3
[AD-A117508] N83-12855
ENERGY AND ENVIRONMENTAL ANALYSIS, INC., ARLINGTON, VA.
Assessment of current and projected future trends in light-duty-vehicle fuel switching. Subtask 1
[DE82-018816] N83-12440
Industrial energy use, annual report for 1979 - 1980
[PB82-200585] N83-12590
Industrial energy use, volume 2
[PB82-200593] N83-12593
ENERGY RESEARCH CORP., DANBURY, CONN.
Development of a high-rate insoluble zinc electrode for alkaline batteries
[DE82-020608] N83-12572
ENERGY UTILIZATION SYSTEMS, INC., PITTSBURGH, PA.
The 1980 survey and evaluation of utility conservation, load management, and solar end-use projects. Volume 3. Utility load management project
[DE82-007247] N83-12559
ENVIRONMENTAL PROTECTION AGENCY, CORVALLIS, OREG.
A review of aquatic habitat assessment methods
[PB82-189648] N83-12674
ENVIRONMENTAL PROTECTION AGENCY, WASHINGTON, D.C.
Test methods for evaluating solid waste: Physical/chemical methods
[PB82-172156] N83-12210
National ambient noise survey
[PB82-193681] N83-12671
ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Radar analysis for severe weather detection and tracking
[FAA-RD-82-64] N83-12719
ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
SP mountain data analysis
[NASA-CR-169471] N83-12303
Development, implementation and evaluation of satellite-aided agricultural monitoring systems
[E83-10017] N83-12500
Analysis of the profile characteristics of corn and soybeans using field reflectance data
[E83-10018] N83-12501
ENVIRONME..ITAL SCIENCES RESEARCH LAB., RESEARCH TRIANGLE PARK, N.C.
Dependence of nephelometer scattering coefficients on relative humidity: Fronts, nocturnal disturbance and wood smoke
[PB82-188813] N83-12715
ERIE TECHNOLOGICAL PRODUCTS OF CANADA LTD., TRENTON (ONTARIO).
Manufacturing methods and techniquos for miniature high voltage hybrid multiplier modules
[AD-A118783] N83-12337

F

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Preliminary evaluation of the basic experimental active Beacon Collision Avoidance System (BCAS)
[DOT/FAA-RD-82-67] N83-12058
Flight test investigation of area calibrated LORAN-C for en route navigation in the Gulf of Mexico
[FAA-RD-82-7] N83-12059
Coast Terminal Radar Approach Control Facility (TRACON) refurbishment
[DOT/FAA-RD-82-38] N83-12060
Omega data bank report (Spring through Fall, 1980)
[DOT/FAA-CT-82-5] N83-12062
Airport Surface Detection Equipment (ASDE)-3 improvements test and evaluation
[DOT/FAA-RD-82-23] N83-12063
Recommendations for automated monitoring of radio equipment associated with flight service stations
[FAA-CT-82-31] N83-12298
Hardware description of mass weather dissemination system exploratory engineering model
[FAA-RD-82-32] N83-12718
The relationship between effort rating and performance in a critical tracking task
[FAA-EM-81-13] N83-12853
FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Census of US civil aircraft, calendar year 1981
[AD-A118571] N83-12039
Summary of Federal Aviation Administration responses to National Transportation Safety Board safety recommendations
[AD-A118692] N83-12055
FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Burroughs Corporation large systems FORTRAN 77
[PB82-183153] N83-12872
DATAPOINT 8800 COBOL release 2.1
[PB82-195686] N83-12873
National CSS, Incorporated, IBM 360/370 OS/VS COBOL release 2.3
[PB82-192964] N83-12874
Wang Laboratories Inc., VS COBOL version 3, 4, 1, technical report
[PB82-195629] N83-12875
Validation summary report; NCR Corporation V8570 VRX FORTRAN 10
[PB82-183641] N83-12877
The Sperry Univac V77 series: COBOL 74-800 release IRO
[PB82-193269] N83-12878
IBM 3033 OS/VS COBOL release 2.3
[PB82-192766] N83-12909
Burroughs Corporation CP9572 CSM system COBOL release
[PB82-186933] N83-12910
Sperry Univac OS.3 COBOL version 07.00/58
[PB82-184920] N83-12911
The MODCOMP NASA extened FORTRAN 78
[PB82-183146] N83-12912
FENIX AND SCISSON, INC., TULSA, OKLA.
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design
[DE82-019781] N83-12561
FLORIDA STATE UNIV., TALLAHASSEE.
Large-scale mean state N83-12727
FLORIDA UNIV., GAINESVILLE.
Analysis of a function to approximate the envelope of a bandpass random signal
[AD-A118460] N83-12941
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, ROME (ITALY).
Use of climatic information for land use planning and crop diversification N83-12742
Agrometeorological monitoring for crop prediction N83-12747
Prediction of range production from weather records in Africa N83-12748
Rainfall variability, types of growing seasons and cereal yields in Tanzania N83-12750
FORECASTING INTERNATIONAL LTD., ARLINGTON, VA.
Evaluation of technology assessments and development of evaluation protocols, project report
[PB82-197393] N83-13027
Evaluation of technology assessments and development of evaluation protocols
[PB82-197385] N83-13028
FOREST SERVICE, WASHINGTON, D.C.
Smoke management: A workbook for balancing air quality and land management goals
[PB82-188830] N83-12673

FRASER (J. KENNETH) AND ASSOCIATES, RENSSELAER, N.Y.
Modular small hydro configuration
[PB82-184953] N83-12327

FREQUENCY ELECTRONICS, INC., NEW HYDE PARK, N.Y.
High performance crystal oscillator development
[AD-A118764] N83-12339

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Advanced Gas Turbine (AGT) powertrain system development for automotive applications
[NASA-CR-165329] N83-13038

GENERAL ELECTRIC CO., CINCINNATI, OHIO.
Antimisting fuel degrader investigation
[FAA-CT-82-72] N83-12247

Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451

GENERAL ELECTRIC CO., EVENDALE, OHIO.
Energy efficient engine. Flight propulsion system preliminary analysis and design
[NASA-CR-159859] N83-12094

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Analysis of small commercial photovoltaic applications
[DE82-020924] N83-12548

GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Development of high temperature turbine subsystem technology to a technology readiness status, phase 2
[DE82-003222] N83-12437

GEOLOGICAL SURVEY, LAKEWOOD, COLO.
Water resources data, water year 1980. Volume 1. Missouri River basin, Arkansas River basin and Rio Grande basin
[PB82-188301] N83-12519

GEORGIA INST. OF TECH., ATLANTA.
The kinetics and spectroscopy of aircraft and rocket plume constituents
[AD-A118482] N83-12183

Locating voids beneath pavement using pulsed electromagnetic waves
[PB82-185513] N83-12283

A fiber optic beam controller for phased array radars
[AD-A118763] N83-12319

Equivalence testing for FORTRAN mutation system using data flow analysis
[AD-A118840] N83-12896

GEORGIA UNIV., ATHENS.
Tenth NASTRAN User's Colloquium
[NASA-CP-2249] N83-12452

Operating in the age of NASTRAN N83-12453

Recent developments of NASTRAN pre- amd post-processors: Response spectrum analysis (RESPAN) and interactive graphics (GIFTS) N83-12455

Using NASTRAN to solve symmetric structures with nonsymmetric loads N83-12467

Evaluation and reduction of errors induced by the Guyan transformation N83-12468

Persistence in model ecosystems
[PB82-196916] N83-12669

GEOTHERMAL POWER CORP., NOVATO, CALIF.
Geothermal reservoir assessment, Roosevelt Hot Springs
[DE82-020632] N83-12541

GERMAN-FRENCH RESEARCH INST., SAINT-LOUIS (FRANCE).
Introduction to LDA signal analysis and signal processing N83-12418

Signal processing by counters and digital processing of LDA signals N83-12419

Measurements in gas flows and flames N83-12420

GHENT UNIV. (BELGIUM).
Relaxation methods for steady transonic flow calculations by Euler equations N83-12375

GLASGOW UNIV. (SCOTLAND).
Measurement techniques for heat transfer in the turbine using short duration wind tunnel techniques N83-12271

GOODRICH (B. F.) CO., AKRON, OHIO.
Prediction of bead area contact load at the tire-wheel interface using NASTRAN N83-12461

GREAT LAKES ARCHAEOLOGICAL RESEARCH CENTER, INC., WAUKESHA, WISC.
Preliminary investigations: Archaeology and sediment geomorphology, navigation pool 12, Upper Mississippi River. Volume 2. Technical documents and site data sheets
[AD-A118798] N83-12698

H

H. H. AEROSPACE DESIGN CO., INC., BEDFORD, MASS.
A technical analysis of rehosting the National Aerospace System software
[AD-A118826] N83-12069

HAMBURG UNIV. (WEST GERMANY).
The evolution of carbon dioxide N83-12631

HARVARD UNIV., CAMBRIDGE, MASS.
Spectroscopic determination of intermolecular potentials of gas laser components and of major atmospheric constituents
[AD-A118698] N83-12425

HAWAII STATE DEPT. OF PLANNING AND ECONOMIC DEVELOPMENT, HONOLULU.
Geothermal power development in Hawaii. Volume 1. Review and analysis
[DE82-020077] N83-12544

HERSHEY (MILTON S.) MEDICAL CENTER, HERSHEY, PA.
Information load stress, risk taking and physiological responsivity in a visual-motor task
[AD-A118079] N83-12857

HIGH LIFE HELICOPTERS, INC., PUYALLUP, WASH.
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513

HONEYWELL, INC., HOPKINS, MINN.
Evaluation selection of encapsulating plastics for ordnance electronic assemblies
[AD-A118714] N83-12341

HONEYWELL POWER SOURCES CENTER, HORSHAM, PA.
High efficiency lithium-thionyl chloride cell
[AD-A118696] N83-12537

HOUSTON UNIV., TEX.
Electromagnetic methods of nondestructive evaluation
[AD-A118587] N83-12443

The possible modifications of the Hisse model for pure LANDSAT agricultural data N83-12497

HUGHES AIRCRAFT CO., CULVER CITY, CALIF.
RADC thermal guide for reliability engineers
[AD-A118839] N83-12338

HUGHES RESEARCH LABS., MALIBU, CALIF.
GaAs surface passivation for device applications
[AD-A118777] N83-13014

Semiconductor measurement technology: Differential capacitance-voltage profiling of Schottky barrier diodes for measuring implanted depth distributions in silicon
[PB82-183575] N83-13022

HUGHES (THOMAS J. R.), STANFORD, CALIF.
Stresspoint algorithm for a pressure-sensitive multiple-yield-surface plasticity theory
[DE82-013922] N83-12473

HULL UNIV. (ENGLAND).
Kinetics of hydrogen-oxygen and hydrocarbon-oxygen reactions
[AD-A118540] N83-12184

HUNGARIAN METEOROLOGICAL SOCIETY, BUDAPEST.
On the scales of different air pollution processes N83-12608

HYDROMETEOROLOGICAL CENTRE OF THE USSR (MOSCOW).
Main principles of monitoring the natural environment and climate N83-12600

Problems of air pollution monitoring N83-12607

Material on the background integrated monitoring of natural environmental pollution N83-12609

Hydrochemical observations at Lake Baikal. Present conditions N83-12616

On the USSR national system of observations and assessment of long range transport of air pollutants N83-12618

Aircraft and remote measurements of atmospheric transport of pollutants within the global integrated monitoring system N83-12620

Problems of background monitoring of surface waters N83-12626

Determination of biota responses to anthropogenic impacts in the system of background monitoring N83-12633

Study of pollutant migration processes in the soil-plant, soil-water system N83-12640

Use of nonspecific response of aquatic populations to the impact of pollutants as a monitoring system N83-12645

Background parameters of atmospheric precipitation chemical composition as siting criteria for global monitoring stations N83-12646

Research on the chemical composition of precipitation at background stations N83-12647

Monitoring of meteorological elements in a composite program for environmental pollution studies N83-12648

Methods for background monitoring of pollutants in natural media N83-12649

Instruments and methods for monitoring background soil pollution N83-12650

Circulation models of pollutants (heavy metals and pesticides) between geophysical media N83-12651

Mathematical bases for modeling exogenic succession N83-12652

Application of thin film solid sorbents for estimation of SO2 background concentrations N83-12655

Major tasks of GATE N83-12725

A/B and B scale motion and balances in the ITCZ area N83-12732

Main achievements of GARP Atlantic Tropical Experiment (GATE) and its impact on FGGE N83-12735

The effect of climatic variability on agriculture and of agricultural activities on climate N83-12753

I

IDAHO UNIV., MOSCOW.
Gasification kinetics for biomass decomposition
[PB82-199043] N83-12256

IIT RESEARCH INST., CHICAGO, ILL.
Determination of hydrogen permeability in uncoated and coated superalloys
[NASA-CR-165209] N83-12215

Site characteristics for wind energy conversion devices N83-12528

ILLINOIS INST. OF TECH., CHICAGO.
Horizontal and vertical axis wind turbines N83-12529

ILLINOIS UNIV., URBANA.
Chemiluminescence from the reation of 2-methylene-3-acetyloxazoline-4,5-dione with hydrogen peroxide
[AD-A118782] N83-12189

Singlet-oxygenation of a conjugated diallene: Attempt to prepare a stable divinyl peroxide
[AD-A118772] N83-12192

Influence of stirrup-tie shape on inelastic cyclic response of flanged reinforced concrete flexural members
[PB82-184763] N83-12474

Differential/algebraic systems and matrix pencils
[DE82-020138] N83-12946

Minimax linear estimtion and control
[AD-A106983] N83-12960

IMPERIAL COLL. FIELD STATION, ASCOT (ENGLAND).
Monitoring requirements for biological systems N83-12632

IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Numerical Computation of Multi-phase Flows: A course of twelve lectures and computer workshops N83-12366

Numerical computation of multi-phase fluid flow and heat transfer N83-12367

Mathematical methods in nuclear-reactor thermal hydraulics N83-12369

Developments in the procedure for numerical computation of multi-phase-flow phenomena with inter-phase slip, unequal temperatures, et cetera N83-12370

The prediction of steady, three-dimensional flow in pressurized water-stream generators N83-12371

Numerical methods for two- and three-dimensional viscous flows N83-12378

INDIAN INST. OF SCIENCE, BANGALORE.
Powder metallurgy of superalloys N83-12228

INDIAN INST. OF TECH., BOMBAY.
Powder Metallurgy Alloys: Proceedings of the Symposium
[PB82-253931] N83-12227

Some studies on the aluminium alloy formation during sintering of metal powders N83-12230

INDIAN INST. OF TECH., KANPUR.
Carbide-binder phases in cemented carbides N83-12233

INDIAN INST. OF TECH., KHARAGPUR.
Effect of HERF on sintering kinetics of ferrographite composites N83-12231

INDIAN INST. OF TROPICAL METEOROLOGY, POONA.
Methodologies for assessing solar energy potential N83-12758

Harmonic analysis of normal pentad rainfall of Indian Stations
[PB82-186875] N83-12824

Pentad rainfall charts and space-time variations of rainfall over India and the adjoining areas
[PB82-187279] N83-12825

INDIAN SPACE RESEARCH ORGANIZATION, BANGALORE.
National Paper of India for the Second United Nations Conference on Exploration and Peaceful Uses of Outer Space (UNISPACE 82)
[PB82-252743] N83-12113
State of space science and technology N83-12114
Applications of space science and technology N83-12115
An appraisal of the programme N83-12116
Looking ahead N83-12117
International issues N83-12118
International co-operation and the role of the United Nations N83-12119

INFORMATION AND CONTROL SYSTEMS, INC., HAMPTON, VA.
Computational modeling of multispectral remote sensing systems: Background investigations
[NASA-CR-165974] N83-12394

INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE, AVIGNON (FRANCE).
Study of ground winds in Upper Volta: Economic and agronomic consequences for the Sudan-Sahel region of west Africa N83-12751

INSTITUTE FOR ATMOSPHERE OPTICS AND REMOTE SENSING, HAMPTON, VA.
Atmospheric backscatter model development for CO sub 2 wavelengths
[NASA-CR-3638] N83-12682

INSTITUTE OF GEOLOGICAL SCIENCES, HARWELL (ENGLAND).
Fracture analysis of crystalline rocks: Field measurements and field geomechanical techniques
[PB82-176678] N83-12712

INSTITUTE OF METEOROLOGY AND WATER MANAGEMENT, WARSAW (POLAND).
Monitoring of complementary parameters indispensable for interpretation and use of data on pollution in rainfall N83-12610

INSTITUTE OF SPACE AND ASTRONAUTICAL SCIENCE, TOKYO (JAPAN).
Planet-A, Japanese first interplanetary flight, second edition
[SES-TD-82-014] N83-12110

INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Studies of the aerodynamic forces on artificial satellites
[INPE-2387-PRE/107] N83-12123
Perturbation of artificial satellites due to tides
[INPE-2388-PRE/108] N83-12124
Conditions of attitude stability for a flexible satellite
[INPE-2389-PRE/109] N83-12125
The neutral particle density field around a satellite
[INPE-2504-PRE/185] N83-12126
Flexible satellite orientation, using the modal-analysis method for gyroscopic systems
[INPE-2505-PRE/186] N83-12127
Insolation of a data collecting satellite from the point of view of orbital geometry for optimization of energy conservation
[INPE-2545-RPE/419] N83-12128
Flame propagation analysis of water-alcohol mixtures
[INPE-2548-PRE/205] N83-12180
Combustion instability in solid propellants
[INPE-2507-PRE/187] N83-12249
Compression/depression of images from meteorological satellites for transmission by telephone
[INPE-2373-NTE/183] N83-12294
Asymptotic theory of the scattering of axially symmetric reflectors
[INPE-2402-TDL/089] N83-12295
Recommendations for a standard electronic mail system to be used by space agencies in the development of cross-supported space data systems
[INPE-2533-PRE/199] N83-12296
Television receiver, 4 GHz
[INPE-2478-PRE/164] N83-12301
Circuits for analog voice grade signal processing in single channel per carries (SCPC) fm satellite communications
[INPE-2510-PRE/189] N83-12302
Receiving station for WEFAX signals
[INPE-2501-NTE/191] N83-12307
The design of transitions in waveguides
[INPE-2369-PRE/409] N83-12328
An active filter capable of realizing any stable transfer function
[INPE-2554-RPE/418] N83-12331
Determination of conductive thermal resistance of plates with nonuniform internal heat generation and under various boundary conditions
[INPE-2512-PRE/191] N83-12351
Digital solar sensor project for attitude determination
[INPE-2495-PRE/178] N83-12392
Resonant extinction of lidar returns from the alkali metal layers in the upper atmosphere
[INPE-2493-PRE/176] N83-12407
Remote sensing in geology: Current trends and future prospects with satellite data
[INPE-2514-PRE/193] N83-12509
Analytical mode for interim expansion of electrical energy generating systems
[INPE-2558-TDL/104] N83-12520
Low-latitude total ozone measurements in the Brazilian sector
[INPE-2509-PRE/188] N83-12596
Estimation of pollution concentration at Cacapava, SP, using a three dimensional numerical model
[INPE-2529-RPE/417] N83-12597
The dissipation of a sodium cloud
[INPE-2492-PRE/175] N83-12677
On the possibility of barotropic instability over northeast Brazil
[INPE-2531-PRE/198] N83-12678
On particle ionization rates in the lower ionosphere over the South Atlantic magnetic anomaly
[INPE-2497-PRE/180] N83-12679
Eddy diffusion coefficients in the lower thermosphere
[INPE-2502-PRE/183] N83-12680
An interactive model for atmospheric correction in satellite images
[INPE-2500-PRE/182] N83-12681
Baroclinic analysis of the Southern Hemisphere
[INPE-2541-PRE/203] N83-12683
Possibility of detecting the nuclear gamma line at 6.13 MeV of atmospheric and cosmic origin O(16)
[INPE-2511-PRE/190] N83-12684
Daily geomagnetic lunar tide in the region near Vassouras (23 deg 24 minutes South; 43 deg 39 minutes West
[INPE-2503-PRE/184] N83-12685
Ge(Li) telescope for observing atmospheric gamma ray lines in the Southern Hemisphere
[INPE-2513-PRE/192] N83-12686
Application of a radiational boundary condition to a Baroclinic model
[INPE-2550-PRE/206] N83-12687
Comparison of ionospheric electron density profiles obtained with the International Reference Ionosphere (IRI) 79 model and observed at Cachoeira Paulista
[INPE-2540-PRE/202] N83-12688
Latitudinal variation of telluric and atmospheric gamma-ray radiation
[INPE-2538-PRE/201] N83-12689
Electrical fields at stratospheric balloon altitudes
[INPE-2556-TDL/103] N83-12690
Spectral properties of minerals and rocks and their applications in geology
[INPE-2515-NTE/192] N83-12691
Mathematical inversion methods used for the inference of vertical profiles of atmospheric temperature using remote sounding by satellite
[INPE-2549-RPE/422] N83-12692
Data on the atmospheric surface boundary layer over a cultivated field
[INPE-2522-RPE/414] N83-12694
A study of meteorological time series. Part 2: Applications of autoregressive models
[INPE-2519-PRE/194-PT-2] N83-12717
Climatological study of the intertropical convergence zone and its influence over the northeast of Brazil
[INPE-2534-TDL/101] N83-12720
A baroclinic model of two layers for use in numerical weather forecasting
[INPE-2547-RPE/421] N83-12721
Forecasting the series of rainfalls at Fortaleza using the Burg maximum entropy method
[INPE-2546-RPE/420] N83-12722
A study on interactions between synoptic scale circulating systems and local circulations
[INPE-2494-TDL/097] N83-12723
Relation between ocean temperature and ocean level change in the tropical Atlantic and precipitation in the Amazon region of northeast Brazil
[INPE-2543-PRE/203] N83-12827
SITIM system: Preliminary software design
[INPE-2499-NTE/190] N83-12883
Implementation and testing of a suboptimal procedure for attaining control in dynamic optimization problems
[INPE-20508-TDL/098] N83-12917
Study of problems of ill-conditioned regression in the presence of multicollinearity
[INPE-2401-PRE/115] N83-12921
A numerical study of vertical modes of a model of primitive equations
[INPE-2364-PRE/097] N83-12922
Interpolation methods for multispectral images
[INPE-2450-PRE/148] N83-12923
Digital image interpolators by window methods
[INPE-2498-PRE/181] N83-12929
Systems engineering: A project planning and control methodology
[INPE-2496-PRE/179] N83-12965
A telescope for ultraviolet photometry
[INPE-2439-PRE/140] N83-12990
Electrical resistivity of low energy implantations of P in Si
[INPE-2516-TDL/09] N83-13010
A study of similarity functions in the planetary boundary layer
[INPE-2539-TDL/102] N83-13045
Solar tide in the atmospheric sodium layer
[INPE-2449-PRE/147] N83-13046

INTERMETRICS, INC., BETHESDA, MD.
PASCAL compiler functional specification
[PB82-183989] N83-12876

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION, OGDEN, UTAH.
Static testing to evaluate airtanker delivery performance
[PB82-179946] N83-12079

INTERNATIONAL ATOMIC ENERGY AGENCY, SEIBERSDORF (AUSTRIA).
Nonparametric statistical method for determination of a confidence interval for the mean of a set of results obtained in a laboratory intercomparison
[DE81-701030] N83-12962

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS, ROME (ITALY).
Report of the Monex review meeting
[GARP-SPEC-REPT-38] N83-12707
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979
[GARP-FOR-1] N83-12794
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report
[GARP-FOR-8] N83-12796
Scientific results of the Air Mass Transformation Experiment (AMTEX)
[GARP-PUBL-SER-24] N83-12798
Report of the second session of the Intergovernmental Planning Meeting on Alpex
[GARP-SPEC-REPT-39] N83-12804
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3, summary of data collected 27 Nov. 1978 - 6 Mar. 1979
[GARP-FOR-3] N83-12806
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979
[GARP-FOR-4] N83-12807
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808

IOWA DEPT. OF ENVIRONMENTAL QUALITY, DES MOINES.
Iowa air quality report, 1980
[PB82-189614] N83-12675

IRT CORP., SAN DIEGO, CALIF.
Development of electrical test procedures for qualification of spacecraft against EID. Volume 1: The CAN test and other relevant data
[NASA-CR-165590] N83-12136
Development of electrical test procedures for qualification of spacecraft against EID. Volume 2: Review and specification of test procedures
[NASA-CR-165590] N83-12137

J

JAPAN LIGHT METAL WELDING AND CONSTRUCTION ASSOCIATION, TOKYO.
Application of aluminium alloys to large welded structures in Japan N83-12216

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Application of thermochemical modeling to aircraft interior polymeric materials
[NASA-CR-169384] N83-12237
Antimisting kerosene atomization and flammability
[NASA-CR-169385] N83-12246
Frictional characteristics and heat transfer of antimisting fuels in tubes
[NASA-CR-169388] N83-12248
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308

Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
Apparatus and method to keep the walls of a free space reactor free from deposits of solid materials
[NASA-CASE-NPO-15851-1] N83-12986
Ranging system
[NASA-CASE-NPO-15865-1] N83-12991
Integrated optics in an electrically scanned imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992

JOYCE (T. J.) ASSOCIATES, FAIRFAX, VA.
Assessment of research and development needs for methane fueled engine systems
[PB82-199035] N83-12257

K

KANSAS STATE UNIV., MANHATTAN.
Darrieus wind-turbine and pump performance for low-lift irrigation pumping
[DE82-016270] N83-12564

KANSAS UNIV., LAWRENCE.
Laboratory studies of solvated gas-phase anions
[AD-A118578] N83-12696

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
A three-part geometric model to predict the radar backscatter from wheat, corn, and sorghum
[E83-10005] N83-12485
Data documentation for the 1981 summer vegetation experiment
[E83-10016] N83-12499
Assessment of radar resolution requirements for soil moisture estimation from simulated satellite imagery
[E83-10020] N83-12503

KARLSRUHE UNIV. (WEST GERMANY).
Lay-out of optical systems for laser Doppler anemometers N83-12412
Measurements in liquid flows: Refractive index matching N83-12413
Studies of particle motion by laser Doppler techniques N83-12414
Long range LDA wind velocity measurements using visible laser radiation N83-12415
Turbulence quantities and Reynolds stress in pipe flow of polymer solutions measured by two channel laser Doppler anemometry N83-12416
Heat and mass transfer in turbulent, particulate two phase flows N83-12417

KENTRON INTERNATIONAL, INC., HAMPTON, VA.
Wind-tunnel investigation of effects of wing-leading-edge modifications on the high angle-of-attack characteristics of a T-tail low-wing general-aviation aircraft
[NASA-CR-3636] N83-12049
Extraction of model performance from wall data in a 2-dimensional transonic flexible walled test section
[NASA-CR-165994] N83-12102

KIEL UNIV. (WEST GERMANY).
Physics of the upper tropical ocean N83-12731

KOMBINAT VEB CHEMISCHE WERKE BUNA (WEST GERMANY).
Numerical simulation of air pollutant spreading processes by transport equation N83-12629

KULITE SEMI-CONDUCTOR PRODUCTS, INC., RIDGEFIELD, N. J.
Kilobar blast pressure transducer: 3.4 Kilobar piezoresistive blast pressure sensor using silicon load cell technique
[AD-A118566] N83-12399

KYOTO UNIV. (JAPAN).
Dielectronic recombination of hydrogenic ions
[IPPJ-AM-23] N83-12977

L

LAW ENGINEERING TESTING CO., ATLANTA, GA.
Geological evaluation of Gulf Coast salt domes: Overall assessment of the Gulf Interior Region
[DE82-015755] N83-12703

LEIDEN UNIV. (NETHERLANDS).
Multi-Dimensional continued fraction algorithms
[REPT-145] N83-12928

LIGHTNING LOCATION AND PROTECTION, INC., TUCSON, ARIZ.
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 6: Cloud-to-ground lightning data for FACE-2
[PB82-183187] N83-12817

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Traffic alert and Collision Avoidance System (TCAS 1) design guidelines
[ATC-114] N83-12066
TCAS 1 design guidelines
[ATC-114] N83-12067
Mode S installation and siting criteria
[ATC-99-REV-A] N83-12297
J. F. Long experimental photovoltaic house
[DE82-020506] N83-12547
Data report for the Northeast Residential Experiment Station, May 1982
[DE82-020398] N83-12553
Simulation of thermal aspects of residential photovoltaic systems
[DE82-020399] N83-12555
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
Electrical aspects of photovoltaic-system simulation
[DE82-021956] N83-12568
Data report for the Northeast Residential Experiment Station, Apr. 1982
[DE82-021954] N83-12569
PV module degradation-analysis
[DE82-021123] N83-12570
The AMPS computer system: Design and operation
[ATC-110] N83-12867
Solid state research, 1982-1
[AD-A118847] N83-13015

LITTON SYSTEMS, INC., MORRIS PLAINS, N. J.
Manufacturing methods and technology engineering for growth of large diameter Nd: YAG laser crystals
[AD-A118748] N83-13019

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.
Evaluation of small area crop estimation techniques using LANDSAT- and ground-derived data
[E83-10008] N83-12487
Operation plan for the data 100/LARS terminal system
[E83-10011] N83-12490
Development of a corn and soybean labeling procedure for use with profile parameter classification
[E83-10014] N83-12493
AgRISTARS documents tracking list report
[E83-10019] N83-12502
Earth Observations Division version of the Laboratory for Applications of Remote Sensing System (EOD-LARSYS) user guide for the IBM 370/148. Volume 1: System overview
[E83-10007] N83-12866

LOCKHEED-GEORGIA CO., MARIETTA.
Tone-excited jet: Theory and experiments
[NASA-CR-3538] N83-12968

LONG (JOHN F.) PROPERTIES, INC., PHOENIX, ARIZ.
J. F. Long experimental photovoltaic house
[DE82-020506] N83-12547

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
International research laboratory on the Moon: A proposal for a national commitment
[DE82-010043] N83-12112
Superconducting-transmission-line project at the Los Alamos National Laboratory
[DE82-021835] N83-12344
Attempts at ultraviolet laser initiation of nitromethane and PETN
[DE82-021253] N83-12430
Statistical Techniques Applied to Aerial Radiometric Surveys (STARRS): Discriminant-analysis methods applied to aerial radiometric data and their application to uranium favorability in South Texas. Nation uranium resource evaluation
[DE82-020961] N83-12512
Passive-solar test modules
[DE82-021841] N83-12578
FITS: A function fitting program
[DE82-021259] N83-12907
The PERFLD: A FORTRAN subroutine to calculate first-order perturbations for two-dimensional symmetric multipoles
[DE82-021271] N83-12908
Interconnecting computers with the highspeed parallel interface
[DE82-021260] N83-12916
Space nuclear safety and fuels program
[DE82-004687] N83-12988

LOUISIANA DEPT. OF TRANSPORTATION AND DEVELOPMENT, BATON ROUGE.
Performance tests of full span form bridges
[PB82-183039] N83-12475

LOUISIANA STATE UNIV., BATON ROUGE.
Benchmark notch test for life prediction
[NASA-CR-165571] N83-12451
Performance tests of full span form bridges
[PB82-183039] N83-12475

LUNAR AND PLANETARY INST., HOUSTON, TEX.
Extraterrestrial materials processing and construction
[NASA-CR-167756] N83-12109

M

MAKERERE UNIV., KAMPALA (UGANDA).
Aridity in east Africa: Climatic geomorphology of water resources N83-12756

MARYLAND UNIV., COLLEGE PARK.
Detection of faulty inspection
[AD-A118549] N83-12441
Software Engineering Laboratory (SEL) report to the National Aeronautics and Space Administration
[NASA-CR-169476] N83-12880

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Fracture analysis of PVC pipe materials
[R81-7] N83-12240
Development of an airborne sonic thermometer
[AD-A118774] N83-12400
Heat source: Materials interactions during fusion welding
[AD-A118776] N83-12436
A review of the Energy Productivity Center's least cost energy strategy study
[PB82-188111] N83-12591
Scale effects in liquefied fuel vapor dispersion
[DE82-006198] N83-12659
A heuristic mathematical model for the dynamics of sensory conflict and motion sickness
[NASA-CR-169472] N83-12847
Algorithms for program verification
[AD-A118570] N83-12894
Solve: A non linear least-squares code and its application to the optimal placement of torsatron vertical field coils
[DE82-015605] N83-12950
Theoretical study of nonlinear surface and inhomogeneous processes and their applications to optical bistability
[AD-A118653] N83-12993
Lower-hybrid-heating experiments on the Alcator C and the Versator II Tokamaks
[DE82-013674] N83-13007

MASSACHUSETTS UNIV., AMHERST.
Response of thick cylindrical shells to transient internal loadings
[AD-A118600] N83-12472
Research in adaptive control: Hybrid and constrained structure systems
[AD-A118534] N83-12918

MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).
The use of recrystallised RDX in cast RDX/TNT compositions
[MRL-R-805] N83-12245
A guide to the principal marine fouling organisms, with particular reference to Cockburn Sound, Western Australia
[MRL-R-858] N83-12842

MATHEMATISCH CENTRUM, AMSTERDAM (NETHERLANDS).
Identification and Informative Sample Size
[REPT-147] N83-12924
Semigroup and factorization methods in transport theory
[MATH-CENTRE-TRACT-146] N83-12925
The Solution of Initial Value Problems Using Interval Arithmetic. Formulation and Analysis of an Algorithm
[REPT-144] N83-12926
Edgeworth expansions for linear combinations of order statistics
[MATH-CENTRE-TRACT-105] N83-12927

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Physiochemical/rheological control of nonmetallic materials
[AD-A118590] N83-12177

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Unsteady transonic flow in a two-dimensional diffuser
[AD-A118473] N83-12052
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 1: Formulation of the analysis
[AD-A118459] N83-12318
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 2. Users manual
[AD-A118497] N83-12324
Algorithm for Surface of Translation Attached Radiators (A-STAR). Volume 3. Computer codes
[AD-A118498] N83-12325

METEOROLOGICAL OFFICE, BRACKNELL (ENGLAND).
Large-scale numerical modelling N83-12730
The role of climatological information in the protection of plants and animals N83-12746

Climatological aspects of in-harvest and post-harvest losses N83-12749

METEOROLOGISCHES OBSERVATORIUM, RADEBEUL (EAST GERMANY).
On the spatial interpolation of air pollution fields N83-12621

MICHIGAN STATE UNIV., EAST LANSING.
Radar waveform synthesis for target identification [AD-A118572] N83-12316

MICHIGAN UNIV., ANN ARBOR.
Performance measures for multiprocessor controllers [NASA-CR-169482] N83-12868
Analytical and numerical study of resisting sheets and scattering from particles [AD-A111240] N83-12933

MIDDLE SOUTH SERVICES, INC., NEW ORLEANS, LA.
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design [DE82-019781] N83-12561

MIDDLESEX RESEARCH CENTER, INC., WASHINGTON, D.C.
Effects of metric change on safety in the workplace for selected occupations [AD-A118595] N83-12279

MIDWEST RESEARCH INST., GOLDEN, COLO.
Fundamental air-gasification engineering parameters [DE82-021612] N83-12200
ROSET: A solar-thermal electric-power simulation users guide [DE82-021997] N83-12567
Structural design considerations for a line-focus reflective module using inexpensive composite materials [DE82-021611] N83-12587
Scatterplate flux mapping for solar concentrators [DE82-021359] N83-12588
Boundary-layer mesoscale wind analysis [DE82-020414] N83-12786

MINISTERE DE L'ENERGIE ET DES RESSOURCES (QUEBEC).
Conference on Using Next Generation Earth Observation Satellites: Summary handbook N83-12508

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD, LOWESTOFT (ENGLAND).
Integrated global monitoring of the environment: Policy and principles N83-12602
Marine environmental monitoring requirements: Integrated global monitoring N83-12613

MINISTRY OF AGRICULTURE, MOSCOW (USSR).
Organochlorine pesticides in organisms of wild animals of terrestrial ecosystems N83-12636
Study of wild animal pollution by pesticides: Methodological aspects N83-12642

MINISTRY OF AGRICULTURE, ZANZIBAR (TANZANIA).
Climatic effects on soil erosion in Zanzibar N83-12752

MISSION RESEARCH CORP., ALBUQUERQUE, N. MEX.
FX-25 and FX-100 propagation experiments [AD-A118755] N83-12981

MISSOURI UNIV., COLUMBIA.
Second generation crop yield models review [E83-10003] N83-12483

MITRE CORP., BEDFORD, MASS.
JAMPS data table maintenance manual [AD-A118476] N83-12869

MONSANTO RESEARCH CORP., DAYTON, OHIO.
Colorimetric oil analysis for titanium [AD-A118445] N83-12190
Superior heat-transfer fluids for solar heating and cooling applications. Results of acute oral-toxicity determinations [DE82-002758] N83-12560

MORELAND ASSOCIATES, FORT WORTH, TEX.
Earth-covered buildings: An exploratory analysis for hazard and energy performance [PB82-189564] N83-12285

MOTOROLA, INC., PHOENIX, ARIZ.
Concentrator-solar-cell development [DE82-020119] N83-12551

MOTOROLA, INC., SCOTTSDALE, ARIZ.
VLSI array processor [AD-A118550] N83-12340

MUELLER ASSOCIATES, INC., BALTIMORE, MD.
Status of alcohol-fuels-utilization technology for highway transportation: A 1981 perspective. Volume 1. Spark-ignition engines [DE82-020493] N83-12255

MYERS (RAYMOND H.), BLACKSBURG, VA.
A study of the feasibility of statistical analysis of airport performance simulation [NASA-CR-3633] N83-12959

N

NAGOYA UNIV. (JAPAN).
Analysis of stabilization effect of quadrupole field on theta pinch plasmas [IPPJ-608] N83-12995
Sufficient stability condition for alpha-driven velocity-space modes in compression Tokamak [IPPJ-609] N83-12996
Comments on thermal runaway experiments in sub-ignition Tokamaks [IPPJ-610] N83-12997

NAIROBI UNIV. (KENYA).
The climate of Africa, including feasibility study of climate alert system N83-12737
Characteristics of the tropospheric mean wind flow over Africa during northern winter season N83-12739
The mean horizontal motions over the African atmosphere during the southern summer N83-12740
The weather anomalies during the northern summers of 1972 and 1978 over Africa N83-12743

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Polymer science and engineering: Challenges, needs and opportunities N83-12238
Mineral resources: Genetic understanding for practical applications [PB82-182114] N83-12517
Atmosphere-biosphere interactions: Toward a better understanding of the ecological consequences of fossil fuel combustion [PB82-182098] N83-12672
Study of the upper atmosphere and near-Earth space in polar regions: Scientific status and recommendations for future directions [PB82-198771] N83-12711
Vision research for flight simulation [AD-A118721] N83-12860
Aeronautics research and technology. A review of proposed reductions in the FY 1983 NASA program [NASA-CR-169386] N83-13024
Data management and computation. Volume 1: Issues and recommendations [PB82-188113] N83-13035

NATIONAL AERONAUTICAL LAB., BANGALORE (INDIA).
Production of titanium alloy powders N83-12229

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical engineering: A continuing bibliography (supplement 152) [NASA-SP-7037(152)] N83-12038
STS-5 Fifth Space shuttle mission, first operational flight: Press Kit [NASA-TM-84890] N83-12132
Mission operation report: Space Shuttle program [NASA-TM-84889] N83-12134
Materials processing in space N83-12166
The NASA Geodynamics Program report, 1981 [NASA-TM-85126] N83-12702
Intake and urinary excretion of sodium chloride under varying conditions of effort and environment heat [NASA-TM-76955] N83-12848
Reduction of voluntary dehydration during effort in hot environments [NASA-TM-76956] N83-12849

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
An experimental study of dynamic stall on advanced airfoil section. Volume 2: Pressure and force data [NASA-TM-84245-VOL-2] N83-12048
Thumb actuated two axis controller [NASA-CASE-ARC-11372-1] N83-12098
Strain gage load measurement on the shuttle orbiter [NASA-TM-84898] N83-12135
Polymer materials research at NASA Ames Research Center N83-12150
Fibrous ceramic insulation N83-12160
A model of the thermal-spike mechanism in graphite/epoxy laminates [NASA-TM-84299] N83-12173
Metal phthalocyanine polymers [NASA-CASE-ARC-11405-1] N83-12239
A nonintrusive laser interferometer method for measurement of skin friction [NASA-TM-84300] N83-12393
LANDSAT land cover analysis completed for CIRSS/San Bernardino County project [E83-10024] N83-12507

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. FLIGHT RESEARCH CENTER, EDWARDS, CALIF.
User's manual for THPLOT, A FORTRAN 77 Computer program for time history plotting [NASA-TM-81374] N83-12881

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
High frequency scattering from arbitrarily oriented dielectric disks [NASA-TM-83910] N83-12306
Reciprocating linear motor [NASA-CASE-GSC-12773-1] N83-12332
Reactanceless bandpass amplifier [NASA-CASE-GSC-12788-1] N83-12333
Thermal control system [NASA-CASE-GSC-12771-1] N83-12361
An evaluation of the NASA/GSFC Barnes field spectral reflecometer model 14-758, using signal/noise as a measure of utility [NASA-TM-83969] N83-12396
Tool for releasing optical elements [NASA-CASE-GSC-12794-1] N83-12434
The usage of substructuring analyses in the Get Away Special (GAS) program N83-12466
Heat pipe thermal switch [NASA-CASE-GSC-12812-1] N83-12525
The report of the Gravity Field Workshop [NASA-TM-84003] N83-12693
Oceanographic applications of the Kalman filter [NASA-TM-83993] N83-12829
A fast hidden line algorithm for plotting finite element models [NASA-TM-83981] N83-12879
The DE magnetometer preprocessor users guide [NASA-TM-83999] N83-12882
Anisotropy in MHD turbulence due to a mean magnetic field [NASA-TM-84000] N83-12998
The future of high energy gamma ray astronomy and its potential astrophysical implications [NASA-TM-83986] N83-13042
Evidence for inhomogeneous thermal sources of two spike events of 1978, May 5 and December 4 [NASA-TM-84929] N83-13047

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
AgRISTARS. Semiannual program review presentation to level 1, interagency Coordination Committee [E83-10006] N83-12486

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Application of Zimmerman flutter-margin criterion to a wind tunnel model [NASA-TM-84545] N83-12070
Simulation of time-varying ascent loads on arrays of shuttle tiles in a large transonic tunnel [NASA-TM-84529] N83-12133
Advanced Materials Technology [NASA-CP-2251] N83-12147
Opportunities for composites in commercial transport structures N83-12148
Polymer research at NASA Langley Research Center N83-12149
Fatigue and fracture research in composite materials N83-12152
Processing composite materials N83-12153
Solidification process control for advanced superalloys N83-12155
Advanced powder metallurgy aluminum alloys and composites N83-12156
Advances in metals processing N83-12157
Fatigue and fracture research in metals N83-12158
High-temperature fatigue in metals N83-12159
Recent advances in carbon-carbon materials systems N83-12162
Durability of aircraft composite materials N83-12164
Durability of spacecraft materials N83-12165
Fundamentals of ultrasonic NDE for microstructure/material property interrelations N83-12168
Advances in nondestructive evaluation technology N83-12169
Failure characteristics of graphite-epoxy structural components loaded in compression [NASA-TM-84552] N83-12174
The CMC:3DPNS computer program for prediction of three-dimensional, subsonic, turbulent aerodynamic juncture region flow. Volume 1: Theoretical [NASA-CR-3645] N83-12352
Integrated finite element thermal-structural analysis with radiation heat transfer [NASA-TM-84469] N83-12356

Flow visualiztion in a cryogenic wind tunnel using holography
[NASA-TM-84556] N83-12395
Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397
Vibration isolation and pressure compensation apparatus for sensitive instrumentation
[NASA-CASE-LAR-12728-1] N83-12398
Characterization of soil and postlaunch pad debris from Cape Canaveral launch complex and analysis of soil interaction with aqueous HCl
[NASA-TP-2076] N83-12595
A dual differential interferometer
[NASA-CASE-LAR-12966-I] N83-12969

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
A remote augmentor lift system with a turbine bypass engine
[NASA-TM-82932] N83-12087
Advanced technologies for turbomachinery systems: An overview
[NASA-TM-82949] N83-12090
Rotorcraft convertible engines for the 1980s
[NASA-TM-83003] N83-12091
QCSEE under-the-wing engine-wing-flap aerodynamic profile characteristics
[NASA-TM-82890] N83-12092
Simplification of power electronics for ion thruster neutralizers
[NASA-TM-83004] N83-12141
Parallel plate radiofrequency ion thruster
[NASA-TM-83014] N83-12142
Rail accelerator research at Lewis Research Center
[NASA-TM-83015] N83-12143
Polymer matrix composites research at NASA Lewis Research Center N83-12151
Conservation of strategic metals N83-12154
Research on ultra-high-temperature materials, monolithic ceramics, ceramic matrix composites and carbon/carbon composites N83-12161
Turbine engine materials durability research N83-12163
Tribology N83-12167
PMR-15 polyimide modifications for improved prepreg tack
[NASA-TM-82951] N83-12175
Method and apparatus for gripping uniaxial fibrous composite materials
[NASA-CASE-LEW-13758-1] N83-12176
A software system for emission spectrometry
[NASA-TM-83001] N83-12181
Shock tube measurements of growth constants in the branched chain formaldehyde-carbon monoxide-oxygen system
[NASA-TM-82954] N83-12182
Turbulent solution of the Navier-Stokes equations for an inhomogenous developing shear layer
[NASA-TM-82969] N83-12357
Numerical simulation of the flow and fuel-air mixing in an axisymmetric piston-cylinder arrangement
[NASA-TM-83011] N83-12358
Computer program for a four-cylinder-Stirling-engine controls simulation
[NASA-TM-82774] N83-12359
Film-cooling effectiveness with developing coolant flow through straight and curved tubular passages
[NASA-TP-2062] N83-12360
Elastohydrodynamic lubrication theory
[NASA-TM-81695] N83-12432
Ferrographic and spectrometer oil analysis from a failed gas turbine engine
[NASA-TM-82956] N83-12433
Materials constitutive models for nonlinear analysis of thermally cycled structures
[NASA-TP-2055] N83-12449
Large displacements and stability analysis of nonlinear propeller structures N83-12460
Convergence acceleration of viscous flow computations
[NASA-TM-83039] N83-12930
Correlation of core noise obtained by three signal coherence techniques
[NASA-TM-83012] N83-12966

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Three stage rocket vehicle with parallel staging
[NASA-CASE-MFS-25878-1] N83-12138
Method of and apparatus for generating an interstitial point in a data stream having an even number of data points
[NASA-CASE-MFS-25319-1] N83-12932
The Pinhole/Occulter facility
[NASA-TP-2089] N83-13048

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Retinally stabilized differential resolution television display
[NASA-CASE-JPO-15432-1] N83-12308
Submillimeter wave Schottky barrier diode with low series resistance and low noise
[NASA-CASE-NPO-15935-1] N83-12334
Closed loop electrostatic system
[NASA-CASE-NPO-15553-1] N83-12335
Ranging system
[NASA-CASE-NPO-15865-1] N83-12991
Integrated optics in an electrically . .d imaging Fourier transform spectrometer
[NASA-CASE-NPO-15844-1] N83-12992

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
Laser Doppler measurements in transparent pump impellers N83-12272
General introduction to wind energy conversion
[NLR-MP-81014-U] N83-12527

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
Flow quality of NAL two-dimensional transonic wind tunnel. Part 1: Mach number distributions, flow angularities and preliminary study of side wall boundary layer suction
[NAL-TR-693] N83-12043
Research and development of lift-jet engine, 1
[NAL-TR-699] N83-12084
Research and development of lift-jet engine, 2
[NAL-TR-700] N83-12085
An engine installation for fan jet STOL aircraft using USB powered high lift system (I) engine matching test for circular confluent exhaust duct
[NAL-TR-703] N83-12086
Effects of motion of the equatorial plane on equatorial elements of an Earth satellite
[NAL-TR-695] N83-12120
Optimal low-thrust Earth escape spiral trajectories from geosynchronous orbit
[NAL-TR-704] N83-12121
Experiments on the aft-end ignition of solid propellant rocket
[NAL-TR-694] N83-12139
The development and study of the turbopump system for LOX and LH2 rocket engine
[NAL-TR-696] N83-12140
An experimental and analytical study on spray flow field by liquid/gas coaxial injector elements (I)
[NAL-TR-692] N83-12346
The spreading rate of nonhomogeneous turbulent jets
[NAL-TR-701] N83-12347
Numerical simulation of inviscid compressible flow through two-dimensional cascade by finite area method
[NAL-TR-709] N83-12348
Design and experimental study of low noise hot-wire anemometer with constant current mode
[NAL-TR-697] N83-12391
An experimental study of an aerodynamically optimum windmill
[NAL-TR-698] N83-12522

NATIONAL BUILDING RESEARCH INST., PRETORIA (SOUTH AFRICA).
New directions in office planning: The influence of the fire properties of materials and components on fire safety
[PB82-191214] N83-12290
The physical working environment and its effect on productivity in offices
[PB82-186461] N83-12862

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Thermodynamic data for desulfurization processes
[PB82-184904] N83-12207
Entrainment and heat flux of buoyant diffusion flames
[PB82-196296] N83-12209
Paint solubility testing
[PB82-177049] N83-12244
Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] N83-12287
NBS 30/60 Megahertz Noise Measurement System Operation and Service Manual
[PB82-178989] N83-12345
Seasonal heat loss calculation for slab-on-grade floors
[PB82-182379] N83-12388
Experimental investigation of transport of discrete solids with surge flows in a 10.0 cm diameter partially filled pipe
[PB82-178724] N83-12389
Mechanical properties of concrete mortar at low temperatures
[PB82-185125] N83-12470
Comparative analysis of economic models in selected solar energy computer programs
[PB82-184995] N83-12589

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
GATE observational strategy: A look in retrospect N83-12726
Documentation for the Community Climate Model (CCM) version O
[PB82-194192] N83-12812

NATIONAL COAL BOARD, LEATHERHEAD (ENGLAND).
Fluidised-bed combustion: Combustion of run-of-mine coal in a 12-inch-diameter pressurized fluidised-bed combustor
[DE82-018786] N83-12204

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.
Solar-geophysical data, prompt reports
[PB82-195793] N83-13050
Solar-geophysical data. Comprehensive reports
[PB82-197302] N83-13052
Solar-geophysical data. Comprehensive reports
[PB82-195801] N83-13054
Solar-geophysical data. Prompt reports
[PB82-197294] N83-13055
Solar-Geophysical Data. Part 2: Comprehensive Reports. Number 448: Data for June 1981 and miscellanea
[PB82-184748] N83-13056

NATIONAL HURRICANE AND EXPERIMENTAL METEOROLOGY LAB., CORAL GABLES, FLA.
Synoptic-scale motions N83-12728

NATIONAL INST. FOR TRANSPORT AND ROAD RESEARCH, PRETORIA (SOUTH AFRICA).
Aircraft noise reduction
[PB82-206095] N83-12080

NATIONAL MECHANICAL ENGINEERING RESEARCH INST., PRETORIA (SOUTH AFRICA).
Pipeline transportation of solids: Recent developments in hydraulic pipelines
[PB82-206863] N83-12269

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
A calibrator for optical instruments that measure Cn2 and crosswind
[PB82-188020] N83-12406
Geophysical monitoring for climatic change no. 9
[PB82-193061] N83-12813
Radar applications in cloud and clear-air studies
[PB82-192592] N83-12815
FACE-2 data reductions and analyses (prior to disclosure of the treatment decisions). Part 3: S- and C-band radar observations in support of FACE-2
[PB82-183179] N83-12816
On the determination of precipitation efficiency
[PB82-184938] N83-12820
Focusing mechanisms in the Texas flash floods of 1978
[PB82-185380] N83-12822
Annotated atlas of H-alpha synoptic charts
[AD-A118170] N83-13053
The NOAA-ERL-SEL solar UV radiation research project: Program description N83-13057

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Depth estimation in the airborne oceanographic LIDAR postflight bathymetry processor
[PB82-188194] N83-12838
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 12: Biological studies
[PB82-185638] N83-12839
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 13: Biological studies
[PB82-185646] N83-12840
Environmental assessment of the Alaskan Continental Shelf. Final reports of principal investigators. Volume 16: Biological studies
[PB82-185653] N83-12841

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Sources, composition and transport of suspended particulate matter in Lower Cook Inlet and Northwestern Shelikof Strait, Alaska
[PB82-193236] N83-12837

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Modified version of the TIROS N/NOAA A-G satellite series (NOAA E-J) advanced TIROS N (ATN)
[PB82-194044] N83-12131
Statistical and synoptic evaluations of TIROS-N and NOAA-6 retrievals
[PB82-188053] N83-12826

NATIONAL PARK SERVICE, WASHINGTON, D. C.
Man in space
[PB82-186784] N83-13023

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.
Guide to programs, fiscal year 1983
[NSF-82-57] N83-13058
NATIONAL TECHNICAL UNIV., ATHENS (GREECE).
Le Foll's method and the calculation of attached and separated two dimensional boundary layers N83-12363
NATIONAL TIMBER RESEARCH INST., PRETORIA (SOUTH AFRICA).
Secondary stresses caused by lapped joints
[PB82-206871] N83-12478
NATIONAL UNIV. OF BENIN, COTONOU.
Some climatological aspects of the development of drainage systems in urban areas N83-12763
NATIONAL WEATHER SERVICE, ANCHORAGE, ALASKA.
Sea ice conditions in Cook Inlet, Alaska during the 1979 - 1980 winter
[PB82-180259] N83-12710
NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Climatic aspects of planning impoundments and hydropower operations N83-12754
The disastrous Southern California and Central Arizona floods, flash floods, and mudslides of February 1980. A report to the Administrator
[PB82-185406] N83-12818
Meteorology of important rainstorms in the Colorado River and Great Basin drainages
[PB82-185414] N83-12823
NATURE CONSERVATORY COUNCIL, LONDON (ENGLAND).
Global monitoring: Relevant experience with chemical and biological monitoring in relation to wildlife in the United Kingdom N83-12634
NAVAL AEROSPACE MEDICAL RESEARCH LAB., PENSACOLA, FLA.
Hyperthermia in rhesus monkeys exposed to a frequency (225 MHz) near whole-body resonance
[AD-A118364] N83-12846
NAVAL ARCTIC RESEARCH LAB., BARROW (ALASKA).
Background levels and biogeochemical cycle of CO2 in the Arctic. Multimedia monitoring requirements N83-12606
NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
Comparison of multichannel and two-satellite methods for remote measurement of sea surface temperature
[AD-A118736] N83-12511
Geotechnical, geoacoustical, and sedimentological properties of thirteen bottom sediment cores collected in the shallow water approaches to Norfolk, Virginia
[AD-A118166] N83-12832
Studies of large-scale thermal variability with a synoptic mixed layer model
[AD-A118159] N83-12833
Annotated bibliography of water optical properties of ocean waters
[AD-A118182] N83-12834
Acoustical, physical, and biological properties of surface sediment cores collected from Long Island Sound, August 27-28, 1980
[AD-A118183] N83-12835
NAVAL RESEARCH LAB., WASHINGTON, D. C.
Initial results from HF propagation studies during solid shield
[AD-A118492] N83-12309
Pointing performance of the 8300 series Datron antennas
[AD-A118660] N83-12311
Uniform laser ablative acceleration of targets at 10(14) w/cm(2)
[DE82-020426] N83-12427
On the prospects for artificially inducing equatorial spread F
[AD-A118844] N83-12695
Calculation of cosmic-ray induced soft upsets and scaling in VLSI devices
[AD-A118584] N83-12871
A formal foundation for the trace method of software specification
[AD-A118843] N83-12885
Injection of a high current beam into a modified betatron accelerator
[AD-A118581] N83-12980
High power microwave energy coupling to nitrogen during breakdown
[AD-A118520] N83-12999
A compilation of electronic energy eigenvalues and densities of states of Si, Ge, GaAs, ZnS, and ZnSe
[AD-A118845] N83-13016
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, BETHESDA, MD.
Calculation of contact pressures and frictional effects on mechanical contact surfaces by finite element methods with application to fretting damage prediction
[AD-A118583] N83-12435
On the use of harmonic expansions in magnetic field problems in NASTRAN N83-12457
Finite element solution of torsion and other 2-D Poisson equations N83-12463
NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
The effect of the thermal conditions of training and testing on the performance of motor tasks measuring primary manual abilities
[AD-A118275] N83-12859
NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Ultrasonic pulse propagation in constant-group-velocity media
[AD-A118679] N83-12970
NAVAL TRAINING EQUIPMENT CENTER, ORLANDO, FLA.
A visual technology research simulator for Vertical Take Off and Landing (VTOL)
[AD-A115626] N83-12103
NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
Solution of axisymmetric fluid structure interaction problems with NASTRAN N83-12459
NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
Hydrogen embrittlement in 17-4PH stainless steel
[AD-A118716] N83-12217
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.
Map interpretation for low altitude flight: Evaluation of a prototype course
[AD-A118391] N83-12858
NEVADA UNIV., RENO.
Low- to moderate-temperature geothermal resource assessment for Nevada: Area specific studies, Pumpernickel Valley, Carlin and Moana
[DE82-018598] N83-12584
NEW ENGLAND RESEARCH CENTER, SUDBURY, MASS.
HgCdTe fabrication using directed energy techniques
[AD-A118654] N83-13013
NEW ENGLAND RIVER BASINS COMMISSION, BOSTON, MASS.
The dredging dilemma: System problems and management solutions
[PB82-184979] N83-12288
NEW MEXICO ENERGY INST., LAS CRUCES.
Data report for the Southwest Residential Experiment Station, Mar. 1982
[DE82-020400] N83-12556
NORTH AMERICAN PHILIPS CO., INC., TARRYTOWN, N.Y.
Reciprocating linear motor
[NASA-CASE-GSC-12773-1] N83-12332
NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIV., GREENSBORO.
Solar-cell testing and evaluation
[DE82-016179] N83-12562
NORTH CAROLINA STATE UNIV., RALEIGH.
Intense relativistic electron beam investigations
[AD-A118664] N83-12978
Single crystal epitaxy and characterization of beta-SiC
[AD-A118800] N83-13018
NORTHROP CORP., HAWTHORNE, CALIF.
Experimental investigation of tangential blowing for control of the strong shock boundary layer interaction on inlet ramps
[NASA-CR-165390] N83-12044
Evaluation of a damage accumulation monitoring system as an individual aircraft tracking concept
[AD-A118768] N83-12076

O

OAK RIDGE ASSOCIATED UNIVERSITIES, INC., WASHINGTON, D.C.
Geothermal-resource survey of the Tennessee Valley Region
[DE82-021951] N83-12706
OAK RIDGE NATIONAL LAB., TENN.
Photosynthetic water splitting
[PB82-200684] N83-12206
Near surface modification: New techniques and applications in materials science
[DE82-020704] N83-12223
User's guide for BAYES: A general purpose code for fitting a functional form to experimental data
[DE82-021092] N83-12906
Screening designs for response surface experiments
[DE82-020486] N83-12948
Enhanced ion backscattering near 1800 scattering angles in the two-atom scattering model
[DE82-020475] N83-12983
Long-pulse ion source for neutral-beam applications
[DE82-003521] N83-12984
Computational methods in Tokamak transport
[DE82-016616] N83-13006
OCEAN RESEARCH CONSULTANTS, LA JOLLA, CALIF.
Possible changes in sea level and their causes
[DE82-013848] N83-12836
OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES, PARIS (FRANCE).
Measurement techniques in turbomachines, ultrathin transducers applied to measurements in turbomachines N83-12273
Optical systems in laser anemometry N83-12409
Adaptation of laser velocimeters to various applications N83-12410
High velocity measurements: Special requirements N83-12411
OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, D. C.
Managing Federal information resources: Report under the Paperwork Reduction Act of 1980
[PB82-194473] N83-13037
OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.
Exploratory Workshop on the Social of Robotics: Summary and issues. A background paper
[PB82-184862] N83-12861
Impact of advanced air transport technology. Part 2: The air cargo system, background paper
[PB82-186818] N83-12919
Impact of advanced transport technology. Part 3: Air service to small communities
[PB82-186800] N83-12920
OGDEN AIR LOGISTICS CENTER, HILL AFB, UTAH.
LGM-30B, stage 2 dissected motors test report
[AD-A118848] N83-12146
OHIO STATE UNIV., COLUMBUS.
An investigation of the aerodynamic characteristics of a new general aviation airfoil in flight
[NASA-CR-169477] N83-12046
Changes in the organ of hearing produced by sound
[AD-A118003] N83-12850
An experimental study of an ultra-mobile vehicle for off-road transportation
[AD-A118474] N83-13039
OHIO UNIV., ATHENS.
The effects of precipitation static and lightning on the airborne reception of Loran-C. Volume 1: Analysis
[DOT/FAA-RD-82-45-1] N83-12299
OLD DOMINION UNIV., NORFOLK, VA.
Development of computer models for the prediction of large distorted antenna characteristics
[NASA-CR-169479] N83-12304
On higher eigenstates of Goertler instability in compressible flow
[NASA-CR-169480] N83-12355
ONE AMERICA, INC., WASHINGTON, D.C.
Questions and answers about energy recovery from waste
[DE82-022154] N83-12580
OPERATIONS RESEARCH, INC., SILVER SPRING, MD.
Aircraft flight procedure program: Data base development
[PB82-183740] N83-12040
Aircraft flight procedure program: Modified computer program model, user's manual
[PB82-183757] N83-12041
ORANGE FREE STATE UNIV., BLOEMFONTEIN (SOUTH AFRICA).
A randomized solution for multi-Bayes estimates of the multinormal mean
[TR-69] N83-12952
The prediction of a future observation by more than one Bayesian
[TR-68] N83-12953
Confidence intervals for a multivariate normal mean in the case of empirical Bayes estimation using Pearson curves and normal approximations
[TR-70] N83-12954
On a generalization of the matric-t distribution
[TR-71] N83-12955
Three-Bayesian estimation of a multinormal mean: An example
[TR-72] N83-12956
On patterned matrices and their applications in multivariate statistics
[TR-67] N83-12957
OTAWA (TORU), MUNICIE, IND.
Development of a slide program describing a site selection process for small Wind-Energy-Conversion Systems (SWECS)
[DE82-017394] N83-12788

P

PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Improved manufacturing techniques for rf and laser hardening of missile domes, phase 1
[DE82-020117] N83-12428
A survey of spectral response measurements for photovoltaic devices
[DE82-006221] N83-12545
Candidate wind-turbine-generator site: Data summary
[DE82-020416] N83-12785
PARAMETRICS, INC., WALTHAM, MASS.
Operation of the rapid scan particle spectrometer SC5 on the SCATHA satellite
[AD-A118724] N83-12401
PATTERN ANALYSIS AND RECOGNITION CORP., NEW HARTFORD, N.Y.
On-Line Pattern Analysis and Recognition System, OLPARS 6. Programmer and system maintenance manual
[AD-A118731] N83-12899
On-line Pattern Analysis and Recognition System, OLPARS 6. Software reference manual
[AD-A118732] N83-12900
On-Line Pattern Analysis and Recognition System, OLPARS 6. Users manual
[AD-A118733] N83-12901
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Efficiency improved turboprop
[AD-A118819] N83-12096
Performance and emissions characteristics of aqueous alcohol fumes in a DI diesel engine
[NASA-CR-167917] N83-12250
Statistical modeling of the infrared flux and albedo based on a four-year satellite archive
[PB82-185315] N83-12821
PHYSICAL RESEARCH LAB., AHMEDABAD (INDIA).
A bakable glass Pirani gauge for monitoring low vacuum
[PB82-190307] N83-12405
Structured programming and PASCAL: A new programming language
[PB82-188921] N83-12913
Computerised book procurement system: System analysis
[PB82-188947] N83-13036
PIASECKI AIRCRAFT CORP., PHILADELPHIA, PA.
Hybrid LTA vehicle controllability as affected by buoyancy ratio
[NASA-CR-152344] N83-12099
PLACER AMEX, INC., SAN FRANCISCO, CALIF.
Coal to methanol feasiblity study: Beluga methanol project. Volume 4: Environmental
[DE82-006057] N83-12542
POLISH ACADEMY OF SCIENCES, WARSAW.
Concrete composites. Fiber reinforced polymer concretes: Properties and principles of use
[ISSN-0208-5658] N83-12171
Experimental studies of the effect of scale on the stressing of metals
[ISSN-0208-5658] N83-12211
Analysis of the properties of vibroisolating material described using the reological model
[ISSN-0208-5658] N83-12236
A regressive model of isochronism in speech units
[ISSN-0208-5658] N83-12291
Nonlinear dynamics of axisymmetric bodies and shells subjected to arbitrary loading
[ISSN-0208-5658] N83-12444
Diagnostic problems with technical systems
[ISSN-0208-5658] N83-12964
PORTLAND STATE UNIV., OREG.
Models and estimation procedures for the analysis of subjects-by-items data arrays
[AD-A118730] N83-12856
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Introduction: Measurements of steady state fluid dynamic qualities N83-12261
Measurement of non-steady fluid dynamic quantities N83-12262
Measurement of metal temperature heat flux and strain N83-12264
PRINCETON UNIV., N. J.
Rotor aerodynamics in ground effect at low advance ratios
[AD-A118609] N83-12051
High temperature catalytically assisted combustion
[AD-A118641] N83-12188
AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945
PUBLIC TECHNOLOGY, INC., WASHINGTON, D. C.
Biological processes in the treatment of municipal water supplies
[PB82-199704] N83-12664
PURDUE UNIV., LAFAYETTE, IND.
The WISGSK: A computer code for the prediction of a multistage axial compressor performance with water ingestion
[NASA-CR-3624] N83-12093
Effects of gain and delay time of control devices to structural study
[PB82-194152] N83-12286
Numerical computation of multi-phase fluid flow and heat transfer N83-12367
One-dimensional unsteady two-phase flows with interphase slip: A numerical study N83-12368
Performance comparison for Barnes model 12-1000, Exotech model 100, and Ideas Inc. Biometer Mark 2
[E83-10004] N83-12484
Extension of laboratory-measured soil spectra to field conditions
[E83-10021] N83-12504
Remote sensing of agricultural crops and soils
[E83-10023] N83-12506
High-intensity solar cells
[DE82-020420] N83-12550
A two-stage elimination type procedure for selecting the largest of several normal means with a common unknown variance
[AD-A118501] N83-12943
On isotonic selection rules for binomial populations better than a standard
[AD-A118548] N83-12961

Q

QEB, INC., LAKEWOOD, COLO.
Airborne gamma-ray spectrometer and magnetometer survey. Volume 1. Detail areas, Christmas Mountains, Solitario, Green Valley/0-2 Ranch, Texas
[DE82-021614] N83-12513

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Concept evaluation of automotive propulsion using liquid air/nitrogen, task 5 report N83-12439
RADIAN CORP., DURHAM, N.C.
Mechanisms of dry SO2 control processes
[PB82-196924] N83-12668
RAND CORP., SANTA MONICA, CALIF.
Transmission and orbital constraints in space-related programs: Briefing summary, addendum
[AD-A118809] N83-12111
RAYTHEON CO., SUDBURY, MASS.
Care 3 phase 2 report, maintenance manual
[NASA-CR-165863] N83-12863
Care 3 phase 2 report, user's manual
[NASA-CR-165864] N83-12864
The CARE 3 phase 3 report: Test and evaluation
[NASA-CR-3631] N83-12865
READING UNIV. (ENGLAND).
Determining optimum planting date by analysis of rainfall data at Morogoro, Tanzania N83-12744
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Chemical durability improvement and static fatigue of glasses
[AD-A118837] N83-12242
RESEARCH TRIANGLE INST., RESEARCH TRIANGLE PARK, N.C.
Estimating cloud parameters for Neros I
[PB82-186552] N83-12814
RHODE ISLAND UNIV., KINGSTON.
Viterbi tracking of randomly phase-modulated data (and related topics)
[AD-A118613] N83-12889
Algorithmic complexity, volume 2
[AD-A118814] N83-12892
Algorithmic complexity, volume 1
[AD-A118813] N83-12893
RICE UNIV., HOUSTON, TEX.
Phase equilibrium studies for methane/synthesis gas separation: The hydrogen-carbon monoxide-methane system
[PB82-200637] N83-12208
RISO NATIONAL LAB., ROSKILDE (DENMARK).
Methodologies for assessing windpower potential N83-12759
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Automated balance for determining true mass
[DE82-021737] N83-12402
Safety data for small wind systems
[DE82-015400] N83-12565
ROCKWELL INTERNATIONAL CORP., LOS ANGELES, CALIF.
Improved methods for predicting spectrum loading effects. Volume 1: Technical summary
[AD-A118856] N83-12077
Improved methods for predicting spectrum loading effects. Volume 2: Test data
[AD-A118857] N83-12078
ROCKWELL INTERNATIONAL CORP., PITTSBURGH, PA.
Improving a NASTRAN dynamic model with test data using LINWOOD N83-12458
ROLLS-ROYCE LTD., DERBY (ENGLAND).
Blade pressure measurements N83-12275
ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Nulling in linear array patterns with minimization of weight perturbations
[AD-A118695] N83-12310
Effects of energetic particle events on VLF/LF propagation parameters, 1979
[AD-A118790] N83-12321
Phase-only nulling as a least-square approximation to complex weight nulling
[AD-A118722] N83-12323
RPK CORP., ATHENS, GA.
NASTRAN of the HEP N83-12465
RUHR UNIV., BOCHUM (WEST GERMANY).
Introduction to multi-grid methods for the numerical solution of boundary value problems N83-12374

S

SAAB-SCANIA, LINKOPING (SWEDEN).
Aerodynamic analysis of horizontal axis wind turbines N83-12530
SAN JOSE STATE UNIV., CALIF.
Sidelobe modulation in far-field radiation patterns
[AD-A118611] N83-12313
SANDIA LABS., ALBUQUERQUE, N. MEX.
Fireset materials aging study
[DE82-020368] N83-12170
Diffusional transformations, strengthening mechanisms, and mechanical properties of uranium alloys
[DE82-020051] N83-12222
Electrical conductivity of rigid polyurethane foam at high temperature
[DE82-020468] N83-12342
Intermediate photovoltaic system application experiment operational performance report. Volume 3: Beverly High School, Beverly, Massachusetts
[DE82-006236] N83-12543
Solar thermal industry status and future needs
[DE82-020885] N83-12546
Preliminary design and definition of field experiments for welded tuff rock mechanics program
[DE82-018916] N83-12705
Filter characterization
[DE82-020466] N83-12903
Starting step size for an ODE solver
[DE82-020422] N83-12904
Implementation of a Distributed Computing Gateway (DCG) at Sandia National Laboratories
[DE82-020120] N83-12915
Smoothing the extrapolated midpoint rule
[DE82-018575] N83-12951
Fusion Energy Division automation of the ISX-B neutral beams
[DE82-016369] N83-13008
SANDIA LABS., LIVERMORE, CALIF.
AIM: The Analytically Integrated Magnus method for linear and second order sensitivity coefficients
[DE82-020887] N83-12945
SCIENCE APPLICATIONS, INC., BOULDER, COLO.
Reduction of radial losses in tandem mirrors
[DE82-020276] N83-13002
Reduction of neoclassical losses in magnetic-confinement devices
[DE82-020277] N83-13003
SCIENCE APPLICATIONS, INC., MCLEAN, VA.
Numerical modeling of tropical weather systems
[AD-A118836] N83-12784
SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
Proceedings of a Colloquium: Sporadic-E and its implications for Radio Communications
[PB82-186578] N83-12714
SCIENCE RESEARCH COUNCIL, DARESBURY (ENGLAND).
Separated-channel static-exchange calculations of the photoionization of the 1 Pi(g) orbital of O2
[PB82-187261] N83-12985

SCIENTIFIC CENTER OF THE NATURAL ENVIRONMENT AND WATER RESOURCES PROTECTION (BULGARIA).
Some principles of the interaction of a global monitoring system with national and regional natural environment pollution observation and information systems N83-12622

SCOTT PAPER CO., CHESTER, PA.
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041

SEVILLE RESEARCH CORP., PENSACOLA, FLA.
Evaluating the use of electronic flight instrument systems in general aviation aircraft
[AD-A118604] N83-12083

SHEFFIELD UNIV. (ENGLAND).
Climatological aspects of building with special reference to wind related phenomena N83-12760

SIKORSKY AIRCRAFT, STRATFORD, CONN.
Flight service evaluation of composite helicopter components
[NASA-CR-165952] N83-12071

SOFTECH, INC., DAYTON, OHIO.
JOVIAL J73 programming support library
[AD-A118825] N83-12891

SOLAR TURBINES INTERNATIONAL, SAN DIEGO, CALIF.
Development report for the 10 KW sound attenuation program (preproduction F kit)
[AD-A118810] N83-12971

SOUTH CAROLINA UNIV., COLUMBIA.
Unsteady boundary layer due to an oscillating free stream vs. an oscillating model
[AD-A118591] N83-12383

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Characterization and evaluation of re-refined engine lubricating oil
[AD-A118573] N83-12241
Biotechnology research requirements for aeronautical systems through the year 2000, volume 1
[AD-A118457] N83-12844
Biotechnology research requirements for aeronautical systems through the year 2000, volume 2
[AD-A118458] N83-12845

SPIRE CORP., BEDFORD, MASS.
HgCdTe fabrication using directed energy techniques
[AD-A118654] N83-13013

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.
ARTS 2A design analysis
[FAA-RD-82-54] N83-12064
Deflagration-to-detonation in HMX-based propellants
[AD-A118616] N83-12251
Theoretical study of state-to-state collisions
[AD-A118586] N83-12979

STANFORD RESEARCH INST., MENLO PARK, CALIF.
National software works development
[AD-A118494] N83-12886

STANFORD UNIV., CALIF.
Experimental investigations of mean stress effect of metal fatigue using discriminating specimens N83-12212
Research on adaptive antenna techniques, 4
[AD-A118802] N83-12315
Higher level simulations of turbulent flows
[SU-TF-16] N83-12373
Electrolytic deposition of low-cost, high-purity polysilicon suitable for use in solar-cell devices
[DE82-012428] N83-12552
Multidimensional additive spline approximation
[SU-ORION-006] N83-12931
An algorithm for reducing acyclic hypergraphs
[AD-A118535] N83-12936
Smoothing of scatterplots
[ORION-003] N83-12958
Review of observations relevant to solar oscillations
[NASA-CR-169387] N83-13049

STATE HYDROLOGICAL INST. (USSR).
On possible changes of the global climate N83-12624
Hydrological aspects of water quality monitoring under the conditions of anthropogenic impact N83-12654

STATE OCEANOGRAPHIC INST., MOSCOW (USSR).
Monitoring of world ocean pollution N83-12614
Scientific aspects of the organization of biological monitoring of the Baltic Sea ecosystem state N83-12635

STUTTGART UNIV. (WEST GERMANY).
Static and dynamic analysis for hinged rotor blades of 60 m span for a two bladed horizontal axis wind energy converter N83-12535

SYDNEY UNIV. (AUSTRALIA).
Shear in composite beam-to-column connections
[PB82-187246] N83-12479

SYSTEMS AND APPLIED SCIENCES CORP., RIVERDALE, MD.
Technique development for weather forecasting
[AD-A118744] N83-12781
Solar radiative flux calculations from standard surface meteorological observations
[AD-A118775] N83-13051

SYSTEMS CONTROL TECHNOLOGY, INC., WEST PALM BEACH, FLA.
Instrument approach aids for helicopters
[FAA-RD-82-6] N83-12061
The 30 LORAN-C navigator documentation
[DOT/FAA-RD-82-16] N83-12065
Application of the microwave landing system to helicopter operations
[FAA-RD-82-40] N83-12068

SYSTEMS SCIENCE AND SOFTWARE, LA JOLLA, CALIF.
A model for tectonic strain release from explosions in complex prestress fields applied to anomalous seismic waves from NTS and eastern Kazakh explosions
[AD-A118503] N83-12697

T

TACTICAL AIR COMMAND, LANGLEY AFB, VA.
F-106 tow system (IOT&E)
[AD-A118527] N83-12074

TEA, INC., HARRISVILLE, N.H.
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566

TECHNICAL UNIV. OF DENMARK, LYNGBY.
Users experience in Denmark: Developments, achievements and experience of the Danish activities in wind energy utilization, 1974 - 1981 N83-12536

TEKNEKRON, INC., BERKELEY, CALIF.
Harnessing the Sun for development: Actions for consideration by the international community at the UN Conference on New and Renewable Sources of Energy for promoting the use of renewable energy in developing countries
[DE82-020273] N83-12558

TELOS, OXNARD, CALIF.
Pilot performance and stress: Search for a killer N83-12851

TENNESSEE UNIV., KNOXVILLE.
The design, assembly and operation of an electric field dominated plasma facility
[AD-A118557] N83-13000

TENNESSEE UNIV. SPACE INST., TULLAHOMA.
Three-dimensional current distribution in coal-fired MHD channels
[DE82-016958] N83-13005

TEXAS A&M UNIV., COLLEGE STATION.
Theoretical questions concerning contact and fracture phenomena for elastic and viscoelastic material and associated methematical techniques
[AD-A118579] N83-12178
Development of advanced acreage estimation methods
[E83-10015] N83-12494
System support documentation: IDIMS FUNCTION AMOEBA N83-12495
Rice scene radiation research plan N83-12496
Missing observations in multiyear rotation sampling designs
[E83-10022] N83-12505
Metal chelate catalysts for fuel cells
[PB82-195637] N83-12592

TEXAS UNIV., ARLINGTON.
Magnetic phase transitions and ground state properties of magnetic crystals
[AD-A118842] N83-13011

TEXAS UNIV., AUSTIN.
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187923] N83-12107
Operation and maintenance of geodetic satellite observatory, McMurdo, Antarctica
[PB82-187931] N83-12108
Computer modeling of a wideswath SAR concept employing multiple antenna beam formation techniques
[NASA-CR-167757] N83-12305
Field tests of a continuous twin girder steel bridge
[PB82-185901] N83-12477
A multi-site magnetotelluric measurement system with real-time data analysis
[DE82-020596] N83-12704
Geologic studies of geopressured and hydropressured zones in Texas: Supplementary tasks
[PB82-200619] N83-12708
Development of an image segmentation algorithm called MITES
[AD-A118577] N83-12897
High-intensity sound in air saturated fibrous bulk porous materials
[NASA-CR-167979] N83-12967

TEXTRON BELL HELICOPTER, FORT WORTH, TEX.
Slack wire strike protection concepts
[AD-A118827] N83-12056

TORONTO UNIV. (ONTARIO).
Aerophysical aspects of gas and plasma flows
[AD-A118588] N83-12384
Basic principles and siting criteria for multimedia monitoring N83-12601

TOTAL ENVIRONMENTAL ACTION, INC., HARRISVILLE, N.H.
Design and fabrication of a prototype system for photovoltaic residences in the Southwest
[DE82-020783] N83-12554

TRACOR, INC., AUSTIN, TEX.
Hybrid tracking algorithm improvements and cluster analysis methods
[AD-A118470] N83-12944

TRISOLAR CORP., BEDFORD, MASS.
Study of photovoltaic residential retrofits. Volume 2: Main report
[DE82-015626] N83-12566

TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Towards wind-aided flame spread along a horizontal charring slab: The steady-flow problem
[PB82-183732] N83-12282

TRW, INC., REDONDO BEACH, CALIF.
Integrated propulsion for near-Earth space missions. Volume 1: Executive summary
[NASA-CR-167889] N83-12144
Integrated propulsion for near-Earth space missions. Volume 2: Technical
[NASA-CR-167889] N83-12145
Direct beam-quality measurement in pulsed aerodynamic windows
[DE82-019285] N83-12429

TUFTS UNIV., MEDFORD, MASS.
Pointing payload for single tether balloons
[AD-A118770] N83-12054

TULSA UNIV., OKLA.
The Akaike information criterion and its application to mixture proportion estimation N83-12498

U

UNITED ENGINEERS AND CONSTRUCTORS, INC., PHILADELPHIA, PA.
Preliminary design study of compressed-air energy storage in a salt dome. Volume 4. CAES turbomachinery design
[DE82-019781] N83-12561

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION, PARIS (FRANCE).
World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802

UNITED NATIONS ENVIRONMENT PROGRAM.
The Global Environmental Monitoring System (GEMS): Principles and progress N83-12603

UNITED STATES METRIC BOARD, ARLINGTON, VA.
Research overview and analysis
[AD-A118594] N83-12280
Metric usage study: A look at 6 case histories
[AD-A118601] N83-12312

UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 1: Analysis and results
[NASA-CR-167990-VOL-1] N83-12353
Analytical modeling of operating characteristics of premixing-prevaporizing fuel-air mixing passages. Volume 2: User's manual
[NASA-CR-167990-VOL-2] N83-12354

UNIVERSITY COLL. OF NORTH WALES, BANGOR.
Static Electrification: Fundamental Concepts, Hazards and Applications
[PB82-183856] N83-12042

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Advanced communication system studies
[AD-A118561] N83-12317
The transiton and dynamics of bounded and free shear layers
[AD-A118665] N83-12380
Image understanding research
[AD-A118738] N83-12994

V

VACUUMSCHMELZE G.M.B.H., HANAU (WEST GERMANY).
Development of soft magnetic alloys with special properties
[PB82-207358] N83-12235
VARIAN ASSOCIATES, BEVERLY, MASS.
Construction, test and delivery of standardized coaxial magnetron
[AD-A118475] N83-12336
VARIAN ASSOCIATES, PALO ALTO, CALIF.
Design concepts for a high-impedance narrow-band 42 GHz power TWT using a fundamental/forward ladder-based circuit
[NASA-CR-165282] N83-12330
VIRGINIA HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL, CHARLOTTESVILLE.
Evaluation of Chem-Crete
[PB82-187808] N83-12284
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Hereditary models for airfoils in unsteady aerodynamics, numerical approximations and parameter estimation
[AD-A118446] N83-12050
Feasibility of computing residual displacements in runways and crater repairs
[AD-A118610] N83-12105
Stiffness reduction resulting from transverse cracking in fiber-reinforced composite laminates
[PB82-179011] N83-12179
Finite element models for predicting crack growth characteristics in composite materials
[NASA-CR-169478] N83-12213
Analytical and experimental analysis of procedures for testing solar domestic hot water systems
[PB82-184839] N83-12287
Ultrasonic transducer with Gaussian radial pressure distribution
[NASA-CASE-LAR-12967-1] N83-12397
Microprocessor self-test: Software self-test for an 8080-based system using a minimum of additional hardware
[AD-A118826] N83-12890
VIRGINIA UNIV., CHARLOTTESVILLE.
New laser dye systems based on transition metal complexes
[AD-A118699] N83-12426
VON KARMAN INST. FOR FLUID DYNAMICS, RHODE-SAINT-GENESE (BELGIUM).
Measurement Techniques in Turbomachines
[VKI-LS-1981-7] N83-12260
Hot wire thermal tuft development for measurement of flow reversal near a compressor blade N83-12274
Separated Flows in Turbomachinery Components, volume 2
[VKI-LS-1981-1-VOL-2] N83-12362
Numerical Computation of Multi-phase Flows
[VKI-LS-1981-2] N83-12365
Computational Fluid Dynamics
[VKI-LS-1981-5] N83-12372
Laser Velocimetry
[VKI-LS-1981-3] N83-12408
Measurements in particulate two phaseflows N83-12424
Wind Energy Conversion Devices
[VKI-LS-1981-8] N83-12526

W

WASHINGTON STATE ENERGY OFFICE, OLYMPIA.
Passive solar energy in Washington: Results of the Washington passive solar design/build/competition
[DE82-020394] N83-12549
WASHINGTON STATE UNIV., PULLMAN.
Role of laser-induced primary-defect formation in optical breakdown in NaCl
[DE82-002062] N83-13020
WASHINGTON UNIV., SEATTLE.
Estimation of flood frequency changes in the Toutle and Cowlitz River basins following the eruption of Mt. St. Helens
[PB82-189473] N83-12518
Chemical and isotope analysis of trace pollutants in different environmental media N83-12612
Comparison of environmental conditions in the Bering Sea and Davis Strait and the effects on microwave signature returns; March and April, 1979
[NASA-CR-169473] N83-12828
Feasibility of acoustically determining the thickness of sea ice
[AD-A118499] N83-12830
Isotopic-abundance ratios and Dirac's large-numbers hypothesis
[DE82-020194] N83-13043
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Cell module and fuel conditioner development
[NASA-CR-165462-A] N83-12524
Research, development and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021216] N83-12582
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Development of automated welding process for field fabrication of thick-walled pressure vessels
[DE82-003062] N83-12438
WESTON (ROY F.), INC., WEST CHESTER, PA.
Demonstration of synergistic industrial energy/municipal solid waste disposal facility
[DE82-001145] N83-13041
WHITE SANDS MISSILE RANGE, N.MEX.
A modified Newton method for multilateration and its application to the RMS/MTTS system
[AD-A118728] N83-12122
WICHITA STATE UNIV., KANS.
Airfoil data for wind turbines N83-12531
Control systems for horizontal-axis wind turbines N83-12532
Wakes produced by single-element and multiple-element wind turbine towers N83-12533
Users manual for WIND N83-12534
WILLS (W. P.), DALLAS, TEX.
Current practices on nighttime pavement construction asphaltic concrete
[DOT/FAA-RD-80-121] N83-12101
WISCONSIN UNIV., MADISON.
Stewartson's triple deck
[AD-A118617] N83-12381
Approximation order from bivariate C1-cubics: A counter example
[AD-A118606] N83-12937
Some properties of viscosity solutions of Hamilton-Jacobi equations
[AD-A118607] N83-12938
Lower bounds for the life span of solutions of nonlinear wave equations in three dimensions
[AD-A118599] N83-12939
The selection of smoothness priors for distributed lag estimation
[AD-A118598] N83-12940
Nonlinear gravity-capillary standing waves in water of arbitrary uniform depth
[AD-A118597] N83-12942
WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Multichannel maximum entropy method of spectral analysis applied to offshore structures
[PB82-182676] N83-12476
WORLD METEOROLOGICAL ORGANIZATION, GENEVA (SWITZERLAND).
Addendum to guidelines for the education and training of personnel in meteorology and operational hydrology. Part 2: Education and training of personnel in operational hydrology
[WMO-258] N83-12481
Hydrological data transmission
[WMO-559] N83-12514
Concepts and techniques in hydrological network design
[WMO-580] N83-12515
Long-range water supply forecasting
[WMO-587] N83-12516
On the Development of Multimedia Monitoring of Environmental Pollution
[WMO-563] N83-12599
The WMO background air pollution monitoring network (BAPMON) N83-12604
Comments on the specifications of network stations for monitoring the variability of atmospheric trace constituents significant for climate N83-12619
Review of atmospheric diffusion models for regulatory applications
[WMO-581] N83-12662
Tropospheric chemistry and air pollution
[WMO-583] N83-12663
Report of the Monex review meeting
[GARP-SPEC-REPT-38] N83-12707
Global Weather Experiment. The GARP Atlantic Tropical Experiment (GATE) Monograph
[GARP-PUB-SER-25] N83-12724
Technical Conference on Climate: Africa
[WMO-596] N83-12736
Summary of the climatological data situation in Africa N83-12741
Application of climate data and information in the management of water resources N83-12755
Manpower resources in Africa: Training requirements and opportunities N83-12765
First planning meeting for the typhoon operational experiment (TOPEX)
[WMO-565] N83-12789
Manual on stream gauging. Volume 1: Fieldwork
[WMO-519-VOL-1] N83-12790
Manual on stream gauging. Volume 2: Computation of discharge
[WMO-519-VOL-2] N83-12791
Climatic changes and their effects on the biosphere. The fourth IMO lecture
[WMO-542] N83-12792
Weather and airborne organisms
[WMO-562] N83-12793
First GARP global experiment operations report series. Volume 1: Observing system operations, 1 December 1978 - 30 June 1979
[GARP-FOR-1] N83-12794
World Weather Watch Tropical Cyclone Programme. Typhoon operational experiment: A general description
[WMO-573] N83-12795
FGGE - The global weather experiment. First GARP global experiment operations report series. Volume 8: Summer MONEX field phase report
[GARP-FOR-8] N83-12796
Selection of distribution types for extremes of precipitation
[WMO-560] N83-12797
Scientific results of the Air Mass Transformation Experiment (AMTEX)
[GARP-PUBL-SER-24] N83-12798
World Weather Watch. Overall report on the Voluntary Cooperation Program, notably on projects approved for transmission to members of the WMO in 1980
[OMM-571] N83-12799
Basic synoptic networks of observing stations
[WMO-217] N83-12800
Manual on the global observing system. Volume 1 (annex to the WMO technical regulations): Global aspects, 1981 edition
[WMO-544-VOL-1-ANNEX] N83-12801
World Integrated Oceanic Services System: General plan and operational program for 1982-1985
[WMO-582] N83-12802
Commission for Marine Technology: Abridged report of the 8th Session
[WMO-584] N83-12803
Report of the second session of the Intergovernmental Planning Meeting on Alpex
[GARP-SPEC-REPT-39] N83-12804
Regional Association 4 (North and Central America). Abridged report of the eighth session
[WMO-586] N83-12805
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 3, summary of data collected 27 Nov. 1978 - 6 Mar. 1979
[GARP-FOR-3] N83-12806
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 4, summary of data collected 7 Mar. - 4 Jul. 1979
[GARP-FOR-4] N83-12807
The Global Weather Experiment. First GARP Global Experiment (FGGE) operations report series: Volume 5, summary of data collected 5 July - December 1979
[GARP-FOR-5] N83-12808
Methods of correction for systematic error in point precipitation measurement for operational use
[WMO-589] N83-12809
Compendium of training facilities for meteorology and operational hydrology
[WMO-240-REV] N83-12810
Activities of the WMO
[WMO-592] N83-12811
Meteorological and hydrological aspects of siting and operation of nuclear power plants. Volume 2: Hydrological aspects
[WMO-550-VOL-2] N83-12989
WYNHOLDS (HANS W.) CO., CUPERTINO, CALIF.
Safety data for small wind systems
[DE82-015400] N83-12565
WYOMING UNIV., LARAMIE.
Data collection and analysis for geothermal research
[PB82-185430] N83-12390

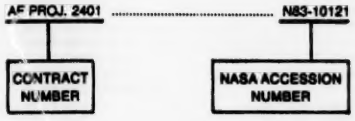
X

XEROX PALO ALTO RESEARCH CENTER, CALIF.
Structure and electronic studies of defects in amorphous silicon
[DE82-018228] N83-13021

Z

ZURICH UNIV. (SWITZERLAND).
The significance of African climate in human health
N83-12761

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

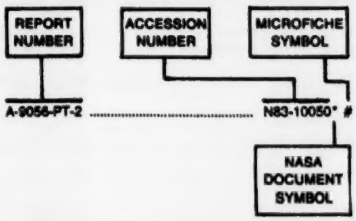
AA-80-SAC-X8604 ..... N83-12277
AA-80-SAC-X8605 ..... N83-12279
AF PROJ. LDFP N83-12319
AF PROJ. 414L N83-12700
AF PROJ. 649L N83-13015
AF PROJ. 2084 ..... N83-12324
N83-12325
AF PROJ. 2301 ..... N83-12978
N83-12979
N83-12993
N83-13000
N83-13011
AF PROJ. 2303 ..... N83-12425
N83-12426
N83-12696
AF PROJ. 2304 ..... N83-12178
N83-12317
N83-12894
N83-12897
N83-12918
N83-12933
N83-12936
AF PROJ. 2305 ..... N83-12310
N83-12313
N83-12323
N83-12844
N83-12845
N83-13014
AF PROJ. 2306 ..... N83-12220
AF PROJ. 2307 ..... N83-12050
N83-12052
N83-12105
N83-12380
N83-12383
N83-12384
N83-12443
AF PROJ. 2308 ..... N83-12183
N83-12184
N83-12188
N83-12251
N83-12385
AF PROJ. 2310 ..... N83-12191
N83-12400
N83-12783
AF PROJ. 2312 ..... N83-12843
N83-12850
AF PROJ. 2315 ..... N83-12895
AF PROJ. 2338 ..... N83-12338
N83-12887
AF PROJ. 2401 ..... N83-12076
N83-12077
N83-12078
AF PROJ. 2404 ..... N83-12095
AF PROJ. 2419 ..... N83-12471
AF PROJ. 2532 ..... N83-12891
AF PROJ. 2688 ..... N83-13051
AF PROJ. 3048 ..... N83-12190
N83-12252
AF PROJ. 4100 ..... N83-12869
AF PROJ. 4600 ..... N83-12321
N83-12339
AF PROJ. 5581 ..... N83-12890
AF PROJ. 6670 ..... N83-12768
N83-12778
N83-12779
N83-12781
N83-12782
AF PROJ. 6687 ..... N83-12699
AF PROJ. 6690 ..... N83-12701
AF PROJ. 7231 ..... N83-12973
AF PROJ. 7659 ..... N83-12054
N83-12322
AF PROJ. 7661 ..... N83-12130
N83-12401
AF-AFOSR-0051-80 ..... N83-12978
AF-AFOSR-0068-80 ..... N83-12050
AF-AFOSR-0069-79 ..... N83-12220
AF-AFOSR-0080-81 ..... N83-12897
AF-AFOSR-0093-82 ..... N83-13000
AF-AFOSR-0102-81 ..... N83-12105
AF-AFOSR-0105-81 ..... N83-12696
AF-AFOSR-0136-81 ..... N83-12843
AF-AFOSR-0155-80 ..... N83-12918
AF-AFOSR-0171-80 ..... N83-12317
AF-AFOSR-0176-81 ..... N83-12313
AF-AFOSR-0182-80 ..... N83-12383
AF-AFOSR-0188-80 ..... N83-12993
AF-AFOSR-0212-80 ..... N83-12936
AF-AFOSR-0225-80 ..... N83-12894
AF-AFOSR-2981-76 ..... N83-13011
AF-AFOSR-3052-76 ..... N83-12188
AF-AFOSR-3188-77 ..... N83-12933
AF-AFOSR-3215-77 ..... N83-12184
AF-AFOSR-3269-77 ..... N83-12425
AF-AFOSR-3290-77 ..... N83-12178
AF-AFOSR-3303-77 ..... N83-12384
AF-AFOSR-3457-77 ..... N83-12443
AF-AFOSR-3590-78 ..... N83-12426
ARPA ORDER 2096 ..... N83-12830
ARPA ORDER 2551 ..... N83-12697
ARPA ORDER 2853 ..... N83-12886
ARPA ORDER 3800 ..... N83-13013
ASL-81-8030 ..... N83-12406
DA PROJ. 1L1-61101-A-91A N83-12218
DA PROJ. 1L1-61102-AH-60 ..... N83-12219
DA PROJ. 1L1-62209-AH-76 ..... N83-12056
DA PROJ. 1L1-62705-AH-94 ..... N83-12537
DA PROJ. 1L6-62616-AH-77 ..... N83-12941
DA PROJ. 1L7-62733-AH-20 ..... N83-12241
DA PROJ. 2Q1-62717-A-790 ..... N83-12106
DA PROJ. 3E1-62720-A-835 ..... N83-12656
DA PROJ. 4A7-62720-A-896 ..... N83-12974
DAAB07-76-C-0041 ..... N83-12337
DAAB06-77-C-0375 ..... N83-13019
DAAG-29-K-0056 ..... N83-12958
DAAG17-73-C-0028 ..... N83-12830
DAAG29-77-G-0095 ..... N83-12472
DAAG29-78-G-0194 ..... N83-12051
DAAG29-79-C-0176 ..... N83-12889
DAAG29-80-C-0041 ..... N83-12381
N83-12937
N83-12938
N83-12939
N83-12940
N83-12942
DAAG29-80-C-0120 ..... N83-12896
DAAG29-80-K-0098 ..... N83-12051
DAAK20-81-C-0381 ..... N83-12537
DAAK21-79-C-0017 ..... N83-12341
DAAK21-81-C-0116 ..... N83-12941
DAAK51-81-C-0034 ..... N83-12056
DAAK70-77-C-0032 ..... N83-12971
DAAK70-80-C-0001 ..... N83-12241
DAAK70-82-C-0001 ..... N83-12241
DACW25-81-C-0045 ..... N83-12698
DACW49-81-C-0045 ..... N83-12657
DARPA ORDER 3119 ..... N83-12994
DARPA ORDER 4001 ..... N83-12340
DARPA ORDER 4395 ..... N83-12947
DE-AC01-76ET-10340 ..... N83-12437
DE-AC01-78PE-70045 ..... N83-12440
DE-AC01-79CS-30027 ..... N83-12538
N83-12539
N83-12540
N83-12563
N83-12574
N83-12575
N83-12576
N83-12577
N83-12579
N83-12585
N83-12787
DE-AC01-80CS-24312 ..... N83-12580
DE-AC02-76CH-00016 ..... N83-12558
N83-12914
DE-AC02-76ER-02383 ..... N83-12946
DE-AC02-76ET-20279 ..... N83-12547
N83-12553
N83-12554
N83-12555
N83-12556
N83-12568
N83-12569
N83-12570
DE-AC02-77CH-00178 ..... N83-12200
N83-12567
N83-12587
N83-12588
N83-12786
N83-13021
DE-AC02-77ET-29015 ..... N83-12561
DE-AC02-78ET-51013 ..... N83-12950
N83-13007
DE-AC02-79ET-10815 ..... N83-13005
DE-AC03-76ET-53057 ..... N83-13002
N83-13003
DE-AC03-76SF-00098 ..... N83-12572
N83-12573
DE-AC03-76SF-00515 ..... N83-12931
N83-12958
DE-AC04-76DP-00613 ..... N83-12170
N83-12243
N83-12281
N83-12343
N83-12660
N83-12949
DE-AC04-76DP-00789 ..... N83-12222
N83-12224
N83-12342
N83-12386
N83-12543
N83-12546
N83-12548
N83-12550
N83-12551
N83-12562
N83-12705
N83-12903
N83-12904
N83-12915
N83-12945
N83-12951
DE-AC04-76DP-03533 ..... N83-12402
N83-12585
DE-AC04-78CS-35356 ..... N83-12560
DE-AC05-76OR-00033 ..... N83-12706
DE-AC05-78ET-13511 ..... N83-12438
DE-AC05-79CS-56051 ..... N83-12255
DE-AC06-76RL-01830 ..... N83-12428
N83-12703
N83-12963
DE-AC06-76RLO-1830 ..... N83-12545
N83-12785
DE-AC06-81ER-40048 ..... N83-13043
DE-AC08-77ET-28406 ..... N83-12541
DE-AC08-81DP-40141 ..... N83-12429
DE-AC08-81NV-10220 ..... N83-12584
DE-AC09-76SR-00001 ..... N83-12658
DE-AC11-76DP-00014 ..... N83-12225
DE-AC13-76GJ-01664 ..... N83-12512
N83-12513
DE-AC21-80MC-14129 ..... N83-12204
DE-AC22-80PC-30304 ..... N83-12199
DE-AI01-76ET-20319 ..... N83-12564
DE-AI01-77CS-51040 ..... N83-12359
DE-AI01-80ET-17088 ..... N83-12524
DE-AI01-81CS-50006 ..... N83-12250

DE-AI21-80-MC14004 ..... N83-12207
DE-AM03-76ER-70067 ..... N83-12552
DE-AS02-77EV-04204 ..... N83-12659
DE-AS05-77ET-28341 ..... N83-12704
DE-AS06-79DP-40105 ..... N83-13020
DE-AT03-81ER-10843 ..... N83-12931
N83-12958
DE-A101-77CS-51040 ..... N83-12215
DE-EG02-80ER-10757 ..... N83-12517
DE-FC03-79ET-27133 ..... N83-12544
DE-FG01-79CS-20245 ..... N83-13041
DE-FG01-80RA-50299 ..... N83-12542
DE-FG02-81R-510301 ..... N83-12788
DE-FG06-79RO-00003 ..... N83-12549
DEN3-6 ..... N83-12215
DEN3-161 ..... N83-12524
DEN3-167 ..... N83-12068
N83-13038
DEN3-168 ..... N83-12431
DEN3-189 ..... N83-12329
DEN3-234 ..... N83-12214
DE82-01968 ..... N83-12439
DI-14-08-001-17202 ..... N83-12476
DOT-FA-79NA-6040 ..... N83-12083
N83-12854
N83-12855
DOT-FA7WAI-242 ..... N83-12867
DOT-FA72WAI-261 ..... N83-12297
DOT-FA72WAI-877 ..... N83-12066
N83-12067
DOT-FA79NA-6043 ..... N83-12247
DOT-FA80NA N83-12237
DTFA01-80-C-10080 ..... N83-12061
N83-12068
DTFA01-80-Y-10595 ..... N83-12069
DTFA01-81-Y-10521 ..... N83-12719
DTFA01-81-Y-10526 ..... N83-12064
DTFA03-80-A-00215 ..... N83-12248
EC-77-A-31-1042 ..... N83-13040
EG-77-C-01-4042 ..... N83-12200
N83-12567
N83-12587
N83-12588
N83-12786
EPA-R-804385 ..... N83-12664
EPA-68-01-6151 ..... N83-12040
EPA-68-01-6267 ..... N83-12041
EPA-68-02-2153 ..... N83-12667
EPA-68-02-3171 ..... N83-12668
EPA-68-02-3428 ..... N83-12814
EPRI PROJ. 1081-2 ..... N83-12561
EPRI PROJ. 1940-1 ..... N83-12559
FA-03-80-A-00215 ..... N83-12246
FAA PROJ. 045-390-130 ..... N83-12059
FAA PROJ. 131-402-540 ..... N83-12718
FAA PROJ. 144-170-900 ..... N83-12298
FAA PROJ. 161-301-150 ..... N83-12853
FAA-043-311-520 ..... N83-12062
FAA-144-170-830 ..... N83-12060
FA01-80-C-10080 ..... N83-12065
FA01-81-C-10007 ..... N83-12299
F08606-79-C-006 ..... N83-12697
F10628-80-C-0042 ..... N83-12300
F19628-79-C-0065 ..... N83-12701
F19628-79-C-0099 ..... N83-12401
F19628-80-C-0002 ..... N83-12066
N83-12067
N83-12297
N83-12867
N83-13015
F19628-80-C-0060 ..... N83-12054
F19628-80-C-0198 ..... N83-12339
F19628-80-K-0089 ..... N83-12400
F19628-81-C-0001 ..... N83-12869
F19628-81-C-0026 ..... N83-12319
F19628-81-C-0039 ..... N83-12781
F19628-81-C-0042 ..... N83-13051
F29601-80-C-0005 ..... N83-12399
F30602-75-C-0156 ..... N83-12886
F30602-75-C-0320 ..... N83-12886
F30602-79-C-0124 ..... N83-12892
N83-12893
F30602-79-C-0230 ..... N83-12895
F30602-80-C-0106 ..... N83-12318
N83-12324
N83-12325
F30602-80-C-0200 ..... N83-12890
F30602-80-C-0244 ..... N83-12891
F30602-81-C-0033 ..... N83-12338
F30602-81-C-0053 ..... N83-12887
F33615-77-C-0512 ..... N83-12850
F33615-77-C-3121 ..... N83-12077
N83-12078
F33615-78-C-1444 ..... N83-13014
F33615-78-C-2019 ..... N83-12252
F33615-79-C-3618 ..... N83-12100
F33615-80-C-0009 ..... N83-12860
F33615-80-C-1080 ..... N83-12994
F33615-81-C-2073 ..... N83-12190
F33615-81-C-3204 ..... N83-12076
F33615-81-K-3017 ..... N83-12095
F49620-77-C-0011 ..... N83-12183
F49620-77-C-0039 ..... N83-12251
F49620-77-C-0082 ..... N83-12052
F49620-78-C-0060 ..... N83-12380
F49620-80-C-0064 ..... N83-12979
F49620-80-C-0065 ..... N83-12385
F49620-81-C-0016 ..... N83-12981
F49620-81-C-0059 ..... N83-12844
N83-12845
GR/NSF EAR-79-02458 ..... N83-12517
GRI-5011-321-0125 ..... N83-12708
GRI-5014-342-0185 ..... N83-12590
GRI-5014-352-0203 ..... N83-12666
GRI-5014-363-0174 ..... N83-12592
GRI-5080-361-0368 ..... N83-12206
GRI-5080-363-0306 ..... N83-12256
GRI-5080-363-0351 ..... N83-12403
GRI-5081-310-0507 ..... N83-12257
GS-05S-10458 ..... N83-12404
H-48-78 ..... N83-12389
HDL PROJ. 80178A N83-12341
HR-10-14 ..... N83-12283
MDA903-81-C-0410 ..... N83-13013
MDA903-82-K-0058 ..... N83-13039
MF5852402 ..... N83-12846
MIPR-FY7121-79-00007 ..... N83-13053
MIPR-N62269/82/MP/00918 ..... N83-12320
MR0000101 ..... N83-12859
MR0410106 ..... N83-12859
NAG1-63 ..... N83-12304
NAG1-228 ..... N83-12355
NAG1-296 ..... N83-12668
NAG2-15 ..... N83-12373
NAG3-45 ..... N83-12449
NAG3-52 ..... N83-12045
NAG3-62 ..... N83-12093
NAG3-91 ..... N83-12250
NAG5-161 ..... N83-12828
NASW-3541 ..... N83-12848
N83-12849
NAS1-184 ..... N83-12046
NAS1-14700 ..... N83-12073
NAS1-15072 ..... N83-12863
N83-12864
N83-12865
NAS1-15105 ..... N83-12352
NAS1-15644 ..... N83-12450
NAS1-16000 ..... N83-12049
N83-12102
NAS1-16078 ..... N83-12523
NAS1-16367 ..... N83-12394
NAS1-16542 ..... N83-12071
NAS2-9281 ..... N83-12044
NAS2-10263 ..... N83-12072
NAS2-101085 ..... N83-12099
NAS3-20643 ..... N83-12094
NAS3-21269 ..... N83-12353
N83-12354
NAS3-21930 ..... N83-12330
NAS3-21967 ..... N83-12136
N83-12137
NAS3-21987 ..... N83-12968
NAS3-22046 ..... N83-12089
NAS3-22147 ..... N83-12047
NAS3-22464 ..... N83-12129
NAS3-22522 ..... N83-12451
NAS3-22661 ..... N83-12144
N83-12145
NAS5-24420 ..... N83-13049
NAS7-100 ..... N83-12248
N83-12308
N83-12334
N83-12335
N83-12986
N83-12992
NAS9-14251 ..... N83-12491
NAS9-14689 ..... N83-12494
N83-12497
N83-12498
N83-12505
NAS9-15343 ..... N83-12847
NAS9-15421 ..... N83-12485
N83-12499
NAS9-15466 ..... N83-12484
N83-12504
N83-12506
NAS9-15800 ..... N83-12487
N83-12490
N83-12493
N83-12502
N83-12866
NAS9-16419 ..... N83-12503
NAS9-16437 ..... N83-12305
NAS9-16538 ..... N83-12500
N83-12501
NA80RA-C-00110 ..... N83-12719
NBS-GT-9020 ..... N83-12183
NBS-5-35891 ..... N83-13022
NB80-NADA-1065 ..... N83-12282
NCC1-15 ..... N83-12213
NGR-05-020-559 ..... N83-13049
NOAA-04-6-158-44013 ..... N83-12821
NO1-CL-0-2117 ..... N83-13029
N83-13030
N83-13031
N83-13032
N83-13033
N83-13034
NR PROJ. 042-243 ..... N83-12943
N83-12961
NR PROJ. 042-334 ..... N83-13025
NR PROJ. 051-616 ..... N83-12189
N83-12192
NR PROJ. 150-481 ..... N83-12870
NR PROJ. 154-429 ..... N83-12856
NR PROJ. 170-909 ..... N83-12857
NR PROJ. 243-027 ..... N83-13018
NR PROJ. 274-299 ..... N83-12944
NR PROJ. 277-291 ..... N83-13025
NR PROJ. 359-653 ..... N83-13017
NR PROJ. 359-718 ..... N83-12185
N83-12186
N83-12187
N83-12193
N83-12194
N83-12195
N83-12196
N83-12197
N83-12198
NR PROJ. 361-146 ..... N83-12221
NR PROJ. 392-023 ..... N83-12982
NSF ATM-77-20580 ..... N83-13049
NSF ATM-77-23757 ..... N83-12812
NSF ATM-78-19363 ..... N83-12727
NSF ATM-80-17245 ..... N83-12728
NSF ATM-81-03697 ..... N83-12728
NSF CHR-79-009931 ..... N83-12238
NSF CME-80-18963 ..... N83-12286
NSF DPP-68-00508 ..... N83-12107
N83-12108
NSF ENG-78-17619 ..... N83-12373
NSF GX-32885 ..... N83-12638
NSF MCS-78-17697 ..... N83-12931
NSF MCS-79-00812 ..... N83-12939
NSF MCS-79-27062 ..... N83-12937
N83-12942
NSF MCS-80-01960 ..... N83-12381
NSF MCS-80-21704 ..... N83-12441
NSF MCS-81-02846 ..... N83-12938
NSF PRA-80-22613 ..... N83-13027
N83-13028
NSF PRA-8009552 ..... N83-13026
NSF 1-0-110-3276-XA452 ..... N83-12885
NSG-2032 ..... N83-12847
NSG-3086 ..... N83-12259
NSG-3198 ..... N83-12967
NSG-3246 ..... N83-13009
NSG-5123 ..... N83-12880
NSG-7172 ..... N83-12102
NSR-09-051-001 ..... N83-12109
N00014-75-C-0455 ..... N83-12943
N83-12961
N00014-75-C-1054 ..... N83-13025
N00014-76-C-0207 ..... N83-13049
N00014-76-C-0364 ..... N83-12377
N00014-76-C-0439 ..... N83-12939
N00014-76-C-0745 ..... N83-12189
N83-12192
N00014-77-C-0240 ..... N83-12982
N00014-77-C-0387 ..... N83-13017
N00014-78-C-0315 ..... N83-12242
N00014-78-C-0670 ..... N83-12944
N00014-79-C-0121 ..... N83-13018
N00014-79-C-0214 ..... N83-12856
N00014-79-C-0231 ..... N83-12896
N00014-79-C-0650 ..... N83-13025
N00014-80-C-0384 ..... N83-12436
N00014-80-C-0581 ..... N83-12857
N00014-80-C-0693 ..... N83-12340
N00014-81-C-2224 ..... N83-12784
N00014-81-K-0014 ..... N83-12960
N00014-81-K-0292 ..... N83-12221
N00014-81-K-0297 ..... N83-12831
N00014-81-K-0301 ..... N83-12441
N00014-81-K-0340 ..... N83-12931
N83-12958
N00014-82-C-0132 ..... N83-12870

N00014-82-G-0017 ..... N83-12185
N83-12186
N83-12187
N83-12193
N83-12194
N83-12195
N83-12196
N83-12197
N83-12198
N00019-80-C-0483 ..... N83-12315
N00019-81-C-0119 ..... N83-12177
N00019-81-C-0321 ..... N83-12316
N00024-78-C-5384 ..... N83-13053
N00024-79-C-6043 ..... N83-12096
N00039-79-C-0150 ..... N83-12336
N60921-81-C-0302 ..... N83-12442
N66001-79-C-0225 ..... N83-12336
PROJ. AGRISTARS N83-12482
N83-12483
N83-12484
N83-12485
N83-12486
N83-12488
N83-12489
N83-12490
N83-12491
N83-12492
N83-12493
N83-12494
N83-12499
N83-12500
N83-12501
N83-12502
N83-12503
N83-12504
N83-12505
N83-12506
N83-12866
PROJ. ORION N83-12931
N83-12958
R-804636 ..... N83-12670
R-806161 ..... N83-12669
RDA-TR-118700-004 ..... N83-12439
RR0110941 ..... N83-12980
RR0140491 ..... N83-12885
RR0210201 ..... N83-13016
RR0210203 ..... N83-13018
RR0420601 ..... N83-12856
SB9-448(A)81-C-480 ..... N83-12064
SF61544508 ..... N83-12442
SF68344601 ..... N83-12999
SRI PROJ. 1680 ..... N83-12979
SRI PROJ. 4051 ..... N83-12886
TRACOR PROJ. 036-013 ..... N83-12944
USASADWC PROJ. 82C-185A N83-12074
USMB-1-0581 ..... N83-12278
W-31-109-ENG-38 ..... N83-12253
N83-12254
N83-12387
N83-12582
N83-12884
N83-12905
N83-12987
W-7405-ENG-26 ..... N83-12223
N83-12559
N83-12906
N83-12948
N83-12983
N83-12984
N83-13006
N83-13008
W-7405-ENG-36 ..... N83-12112
N83-12344
N83-12430
N83-12512
N83-12578
N83-12907
N83-12908
N83-12916
N83-12988
W-7405-ENG-38 ..... N83-12583
W-7405-ENG-48 ..... N83-12203
N83-12427
N83-12473
N83-12571
N83-12661
N83-12836
N83-12947
N83-13001
N83-13004
W-7405-ENG-82 ..... N83-12226
XF12141310 ..... N83-12871
ZF63521080 ..... N83-12858
ZR01301 ..... N83-12970
ZR0230301 ..... N83-12435
505-31-0 ..... N83-12930
505-31-32 ..... N83-12966
505-31-42 ..... N83-12182
505-31-53-06 ..... N83-12102
N83-12395
505-31-63-04 ..... N83-12133
505-32-2A N83-12093
505-32-2B N83-12360
505-32-4A N83-12090
505-32-02 ..... N83-12968
505-32-42 ..... N83-12432
N83-12433
505-32-52 ..... N83-12357
505-33-1A N83-12181
505-33-21 ..... N83-12173
505-33-22 ..... N83-12449
N83-12451
505-33-32 ..... N83-12175
505-33-33-01 ..... N83-12147
505-33-33-06 ..... N83-12174
505-33-53-07 ..... N83-12070
505-34-43-05 ..... N83-12863
N83-12864
N83-12865
505-35-33-02 ..... N83-12959
505-41-32 ..... N83-12358
505-43-92 ..... N83-12087
506-51-11-08-00-21 ..... N83-12393
506-53-33-04 ..... N83-12356
506-53-51 ..... N83-12135
506-55-22 ..... N83-12141
N83-12142
506-55-32 ..... N83-12143
532-06-12 ..... N83-12091
N83-12092
677-16-15 ..... N83-12507
778-32-01 ..... N83-12431
778-35-03 ..... N83-12359
778-38-12 ..... N83-12250
989-15-20-02 ..... N83-12595

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8905 ..... N83-12173* #
A-8920 ..... N83-12507* #
A-8925-VOL-2 ..... N83-12048* #
A-9077 ..... N83-12393* #

AAAF-NT-80-49 ..... N83-12976 #
AAAF-NT-81-22 ..... N83-12081 #

ACC-80-17602 ..... N83-12214* #

ACT-100 ..... N83-12063 #

AD-A106983 ..... N83-12960 #
AD-A111240 ..... N83-12933 #
AD-A115626 ..... N83-12103 #
AD-A116969 ..... N83-12935 #
AD-A116970 ..... N83-12934 #
AD-A117508 ..... N83-12854 #
AD-A117508 ..... N83-12855 #
AD-A117869 ..... N83-12471 #
AD-A118003 ..... N83-12850 #
AD-A118071 ..... N83-12100 #
AD-A118079 ..... N83-12857 #
AD-A118159 ..... N83-12833 #
AD-A118166 ..... N83-12832 #
AD-A118170 ..... N83-13053 #
AD-A118182 ..... N83-12834 #
AD-A118183 ..... N83-12835 #
AD-A118245 ..... N83-13025 #
AD-A118253 ..... N83-12106 #
AD-A118274 ..... N83-12657 #
AD-A118275 ..... N83-12859 #
AD-A118364 ..... N83-12846 #
AD-A118391 ..... N83-12858 #
AD-A118445 ..... N83-12190 #
AD-A118446 ..... N83-12050 #
AD-A118448 ..... N83-12766 #
AD-A118449 ..... N83-12769 #
AD-A118455 ..... N83-12510 #
AD-A118457 ..... N83-12844 #
AD-A118458 ..... N83-12845 #
AD-A118459 ..... N83-12318 #
AD-A118460 ..... N83-12941 #
AD-A118461 ..... N83-12767 #
AD-A118462 ..... N83-12777 #
AD-A118465 ..... N83-12898 #
AD-A118467 ..... N83-13017 #
AD-A118470 ..... N83-12944 #
AD-A118471 ..... N83-12776 #
AD-A118472 ..... N83-12775 #
AD-A118473 ..... N83-12052 #
AD-A118474 ..... N83-13039 #
AD-A118475 ..... N83-12336 #
AD-A118476 ..... N83-12869 #
AD-A118479 ..... N83-12887 #
AD-A118482 ..... N83-12183 #
AD-A118487 ..... N83-12888 #
AD-A118490 ..... N83-12075 #
AD-A118492 ..... N83-12309 #
AD-A118494 ..... N83-12886 #
AD-A118496 ..... N83-12831 #
AD-A118497 ..... N83-12324 #
AD-A118498 ..... N83-12325 #
AD-A118499 ..... N83-12830 #
AD-A118501 ..... N83-12943 #
AD-A118502 ..... N83-12656 #
AD-A118503 ..... N83-12697 #
AD-A118505 ..... N83-12774 #
AD-A118506 ..... N83-12773 #
AD-A118507 ..... N83-12772 #
AD-A118508 ..... N83-12771 #
AD-A118509 ..... N83-12770 #
AD-A118510 ..... N83-12780 #
AD-A118520 ..... N83-12999 #
AD-A118527 ..... N83-12074 #
AD-A118534 ..... N83-12918 #
AD-A118535 ..... N83-12936 #
AD-A118540 ..... N83-12184 #
AD-A118548 ..... N83-12961 #
AD-A118549 ..... N83-12441 #
AD-A118550 ..... N83-12340 #
AD-A118553 ..... N83-12221 #
AD-A118557 ..... N83-13000 #
AD-A118560 ..... N83-12843 #
AD-A118561 ..... N83-12317 #
AD-A118566 ..... N83-12399 #
AD-A118567 ..... N83-12895 #
AD-A118570 ..... N83-12894 #
AD-A118571 ..... N83-12039 #
AD-A118572 ..... N83-12316 #
AD-A118573 ..... N83-12241 #
AD-A118576 ..... N83-12385 #
AD-A118577 ..... N83-12897 #
AD-A118578 ..... N83-12696 #
AD-A118579 ..... N83-12178 #
AD-A118581 ..... N83-12980 #
AD-A118583 ..... N83-12435 #
AD-A118584 ..... N83-12871 #
AD-A118585 ..... N83-12320 #
AD-A118586 ..... N83-12979 #
AD-A118587 ..... N83-12443 #
AD-A118588 ..... N83-12384 #
AD-A118590 ..... N83-12177 #
AD-A118591 ..... N83-12383 #
AD-A118594 ..... N83-12280 #
AD-A118595 ..... N83-12279 #
AD-A118597 ..... N83-12942 #
AD-A118598 ..... N83-12940 #
AD-A118599 ..... N83-12939 #
AD-A118600 ..... N83-12472 #
AD-A118601 ..... N83-12312 #
AD-A118604 ..... N83-12083 #
AD-A118606 ..... N83-12937 #
AD-A118607 ..... N83-12938 #
AD-A118609 ..... N83-12051 #
AD-A118610 ..... N83-12105 #
AD-A118611 ..... N83-12313 #
AD-A118613 ..... N83-12889 #
AD-A118614 ..... N83-12220 #
AD-A118616 ..... N83-12251 #
AD-A118617 ..... N83-12381 #
AD-A118632 ..... N83-12278 #
AD-A118633 ..... N83-12277 #
AD-A118634 ..... N83-12276 #
AD-A118641 ..... N83-12188 #
AD-A118653 ..... N83-12993 #
AD-A118654 ..... N83-13013 #
AD-A118660 ..... N83-12311 #
AD-A118664 ..... N83-12978 #
AD-A118665 ..... N83-12380 #
AD-A118674 ..... N83-12218 #
AD-A118677 ..... N83-13012 #
AD-A118678 ..... N83-12219 #
AD-A118679 ..... N83-12970 #
AD-A118689 ..... N83-12187 #
AD-A118692 ..... N83-12055 #
AD-A118695 ..... N83-12310 #
AD-A118696 ..... N83-12537 #
AD-A118698 ..... N83-12425 #
AD-A118699 ..... N83-12426 #
AD-A118704 ..... N83-12104 #
AD-A118705 ..... N83-12186 #
AD-A118706 ..... N83-12194 #
AD-A118707 ..... N83-12195 #
AD-A118708 ..... N83-12193 #
AD-A118709 ..... N83-12196 #
AD-A118710 ..... N83-12197 #
AD-A118711 ..... N83-12198 #
AD-A118712 ..... N83-12185 #
AD-A118714 ..... N83-12341 #
AD-A118715 ..... N83-12783 #
AD-A118716 ..... N83-12217 #
AD-A118718 ..... N83-13040 #
AD-A118720 ..... N83-12095 #
AD-A118721 ..... N83-12860 #
AD-A118722 ..... N83-12323 #
AD-A118723 ..... N83-12701 #
AD-A118724 ..... N83-12401 #
AD-A118728 ..... N83-12122 #
AD-A118730 ..... N83-12856 #
AD-A118731 ..... N83-12899 #
AD-A118732 ..... N83-12900 #
AD-A118733 ..... N83-12901 #
AD-A118734 ..... N83-12700 #
AD-A118735 ..... N83-12782 #
AD-A118736 ..... N83-12511 #
AD-A118738 ..... N83-12994 #
AD-A118739 ..... N83-12322 #
AD-A118740 ..... N83-12699 #
AD-A118744 ..... N83-12781 #
AD-A118748 ..... N83-13019 #
AD-A118751 ..... N83-12779 #
AD-A118752 ..... N83-12191 #
AD-A118753 ..... N83-12778 #
AD-A118755 ..... N83-12981 #
AD-A118756 ..... N83-12053 #
AD-A118761 ..... N83-12972 #
AD-A118763 ..... N83-12319 #
AD-A118764 ..... N83-12339 #
AD-A118766 ..... N83-12768 #
AD-A118767 ..... N83-12442 #
AD-A118768 ..... N83-12076 #
AD-A118770 ..... N83-12054 #
AD-A118772 ..... N83-12192 #
AD-A118773 ..... N83-12973 #
AD-A118774 ..... N83-12400 #
AD-A118775 ..... N83-13051 #
AD-A118776 ..... N83-12436 #
AD-A118777 ..... N83-13014 #
AD-A118782 ..... N83-12189 #
AD-A118783 ..... N83-12337 #
AD-A118784 ..... N83-12314 #
AD-A118789 ..... N83-12982 #
AD-A118790 ..... N83-12321 #
AD-A118791 ..... N83-12130 #
AD-A118796 ..... N83-12974 #
AD-A118798 ..... N83-12698 #
AD-A118800 ..... N83-13018 #
AD-A118802 ..... N83-12315 #
AD-A118804 ..... N83-12382 #
AD-A118809 ..... N83-12111 #
AD-A118810 ..... N83-12971 #
AD-A118813 ..... N83-12893 #
AD-A118814 ..... N83-12892 #
AD-A118819 ..... N83-12096 #
AD-A118822 ..... N83-12870 #
AD-A118825 ..... N83-12891 #
AD-A118826 ..... N83-12890 #
AD-A118827 ..... N83-12056 #
AD-A118828 ..... N83-12069 #
AD-A118836 ..... N83-12784 #
AD-A118837 ..... N83-12242 #
AD-A118838 ..... N83-12252 #
AD-A118839 ..... N83-12338 #
AD-A118840 ..... N83-12896 #
AD-A118842 ..... N83-13011 #
AD-A118843 ..... N83-12885 #
AD-A118844 ..... N83-12695 #
AD-A118845 ..... N83-13016 #
AD-A118847 ..... N83-13015 #
AD-A118848 ..... N83-12146 #
AD-A118854 ..... N83-12902 #
AD-A118856 ..... N83-12077 #
AD-A118857 ..... N83-12078 #

AD-E400878 ..... N83-13012 #
AD-E440156 ..... N83-12219 #

AD-E440159 ..... N83-12218 #
AD-E850185 ..... N83-12766 #
AD-E850186 ..... N83-12769 #
AD-E850193 ..... N83-12770 #
AD-E850194 ..... N83-12775 #
AD-E850195 ..... N83-12776 #
AD-E850196 ..... N83-12780 #
AD-E850197 ..... N83-12771 #
AD-E850198 ..... N83-12772 #
AD-E850199 ..... N83-12774 #
AD-E850200 ..... N83-12773 #
AD-E850201 ..... N83-12777 #

AD-F500058 ..... N83-12970 #

ADR-1164 ..... N83-12072* #

AEDC-TR-82-10 ..... N83-12104 #

AFAMRL-TR-80-127 ..... N83-12850 #

AFGL-AFSG-437-PT-8 ..... N83-12783 #

AFGL-ERP-761 ..... N83-12782 #
AFGL-ERP-763 ..... N83-12700 #
AFGL-ERP-764-VOL-1 ..... N83-12768 #
AFGL-ERP-765 ..... N83-12779 #
AFGL-ERP-771 ..... N83-12130 #
AFGL-ERP-773 ..... N83-12778 #

AFGL-IP-307 ..... N83-12322 #
AFGL-IP-309 ..... N83-12191 #
AFGL-IP-310 ..... N83-12699 #

AFGL-TR-81-0316-PT-8 ..... N83-12783 #
AFGL-TR-82-0002 ..... N83-12322 #
AFGL-TR-82-0006 ..... N83-12782 #
AFGL-TR-82-0010 ..... N83-12700 #
AFGL-TR-82-0011(1) ..... N83-12768 #
AFGL-TR-82-0020 ..... N83-12781 #
AFGL-TR-82-0022 ..... N83-12191 #
AFGL-TR-82-0027 ..... N83-12779 #
AFGL-TR-82-0039 ..... N83-13051 #
AFGL-TR-82-0063 ..... N83-12130 #
AFGL-TR-82-0076 ..... N83-12054 #
AFGL-TR-82-0078 ..... N83-12778 #
AFGL-TR-82-0079 ..... N83-12699 #
AFGL-TR-82-0119 ..... N83-12701 #
AFGL-TR-82-0164 ..... N83-12401 #
AFGL-TR-82-0179 ..... N83-12400 #
AFGL-TR-82-0212 ..... N83-13053 #

AFHRL-TR-82-6 ..... N83-12860 #

AFLRL-152 ..... N83-12241 #

AFOSR-82-0058TR ..... N83-12933 #
AFOSR-82-0622TR ..... N83-12052 #
AFOSR-82-0623TR ..... N83-12184 #
AFOSR-82-0624TR ..... N83-12183 #
AFOSR-82-0634TR ..... N83-12843 #
AFOSR-82-0635TR ..... N83-13000 #
AFOSR-82-0637TR ..... N83-12317 #
AFOSR-82-0638TR ..... N83-12918 #
AFOSR-82-0639TR ..... N83-12384 #
AFOSR-82-0642TR-VOL-1 ..... N83-12844 #
AFOSR-82-0643TR-VOL-2 ..... N83-12845 #
AFOSR-82-0645TR ..... N83-12894 #
AFOSR-82-0646TR ..... N83-12936 #
AFOSR-82-0647TR ..... N83-12178 #
AFOSR-82-0652TR ..... N83-12380 #
AFOSR-82-0657TR ..... N83-12978 #
AFOSR-82-0658TR ..... N83-13011 #
AFOSR-82-0660TR ..... N83-12696 #
AFOSR-82-0661TR ..... N83-12425 #
AFOSR-82-0662TR ..... N83-12426 #
AFOSR-82-0663TR ..... N83-12897 #
AFOSR-82-0666TR ..... N83-12188 #
AFOSR-82-0667TR ..... N83-12385 #
AFOSR-82-0668TR ..... N83-12979 #
AFOSR-82-0669TR ..... N83-12105 #
AFOSR-82-0670TR ..... N83-12993 #
AFOSR-82-0673TR ..... N83-12251 #
AFOSR-82-0674TR ..... N83-12443 #
AFOSR-82-0675TR ..... N83-12383 #
AFOSR-82-0676TR ..... N83-12313 #
AFOSR-82-0677TR ..... N83-12220 #

AFWAL-TR-81-2138 ..... N83-12190 #
AFWAL-TR-81-3092-VOL-1 ..... N83-12077 #
AFWAL-TR-81-3092-VOL-2 ..... N83-12078 #
AFWAL-TR-81-3170 ..... N83-12095 #
AFWAL-TR-81-3171-VOL-2 ..... N83-12100 #
AFWAL-TR-81-3173 ..... N83-12050 #
AFWAL-TR-82-1088 ..... N83-13014 #
AFWAL-TR-82-1111 ..... N83-12994 #
AFWAL-TR-82-2015 ..... N83-12252 #
AFWAL-TR-82-3023 ..... N83-12076 #
AFWAL-TR-82-4081 ..... N83-12471 #

AFWL-TR-81-224 ..... N83-12399 #

AIAA-82-1880 ..... N83-12141* #
AIAA-82-1938 ..... N83-12143* #

AMC-31-3480(11) ..... N83-12088* #

AMRC-R-391 ..... N83-12981 #

AMRL-TR-75-50-VOL-172 ..... N83-12973 #

ANL-FFP-TM-146 ..... N83-12987 #

ANL-81-73 ..... N83-12884 #
ANL-81-83 ..... N83-12905 #
ANL-82-50 ..... N83-12387 #

ANL/FE-81-53 ..... N83-12253 #
ANL/FE-49628-TM04 ..... N83-12254 #

ANL/OEPM-81-14 ..... N83-12582 #
ANL/OEPM-82-3 ..... N83-12583 #

AP-L2-04116 ..... N83-12502* #

APL-UW-7317 ..... N83-12830 #

APR-1 ..... N83-12221 #

AR-1 ..... N83-12071* #
AR-1 ..... N83-13037 #
AR-002-275 ..... N83-12172 #
AR-002-320 ..... N83-12082 #
AR-002-324 ..... N83-12057 #
AR-002-331 ..... N83-12097 #
AR-002-402 ..... N83-12245 #
AR-003-040 ..... N83-12842 #

ARI-TR-547 ..... N83-12106 #

ARL-AERO-NOTE-407 ..... N83-12097 #

ARL-STRUC-REPORT-386 ..... N83-12172 #

ARL-SYS-NOTE-82 ..... N83-12082 #

ARL-SYS-REPORT-25 ..... N83-12057 #

ARL-TR-81-49 ..... N83-12107 #
ARL-TR-81-50 ..... N83-12108 #
ARL-TR-82-54 ..... N83-12967* #
ARL-TR-82-57 ..... N83-12305* #

ARL/PSU/TM-82-124 ..... N83-12096 #

ARLCB-TR-82009 ..... N83-12219 #
ARLCB-TR-82010 ..... N83-12218 #

ARLCD-TR-82011 ..... N83-13012 #

ARO-14700.2-EG ..... N83-12472 #
ARO-16061.2-EG ..... N83-12051 #
ARO-16437.9-EL ..... N83-12889 #

ATC-99-REV-A ..... N83-12297 #
ATC-110 ..... N83-12867 #
ATC-114 ..... N83-12066 #
ATC-114 ..... N83-12067 #

ATR-2 ..... N83-12436 #
ATR-2 ..... N83-12918 #

AUTO-CARTO-5/ISPRSIV ..... N83-12898 #

BBC-RD-1982/17 ..... N83-12293 #
BBC-RD-1982/18 ..... N83-12292 #

BDX-613-2707 ..... N83-12343 #
BDX-613-2740 ..... N83-12660 #
BDX-613-2784 ..... N83-12243 #
BDX-613-2791 ..... N83-12170 #
BDX-613-2810 ..... N83-12949 #
BDX-613-2816 ..... N83-12281 #

BLL-RISLEY-TR-4173-(9091.9F) N83-12594

BM-RI-8598 ..... N83-12709 #
BM-RI-8607 ..... N83-12205 #

BMFT-FB-T-79-32 ..... N83-12235 #

BNL-30609 ..... N83-12914 #
BNL-51463 ..... N83-12558 #

CAES-590-81 ..... N83-12250* #

CALSPAN-6645-F-8-VOL-2 ..... N83-12100 #

CDH-UW-R-81-11 ..... N83-12390 #

CE-82-23 ..... N83-12831 #

CERL-TR-N-131 ..... N83-12974 #

CER81-82DEN-RNM1 ..... N83-12665 #
CER81-82KMK-RNM-DEN22 ..... N83-12666 #

CM/CCM-82-1 ..... N83-12320 #

CMR-81-16 ..... N83-12552 #

CMSS-MV-82-01 ..... N83-12064 #

COMCO-81TR-2.1 ..... N83-12352* #

CONF-820345-10 ..... N83-13007 #
CONF-820388-1 ..... N83-12946 #
CONF-820411-3 ..... N83-12660 #

CONTRIB-79-435-D ..... N83-12564 #

COO-2383 ..... N83-12946 #

CSIRO-TECHNICAL-PAPER-42 ..... N83-12676 #

CT-82-100-39LR ..... N83-12058 #

CTR-3-5-79-247-2 ..... N83-12477 #

CUED/A-TURBO/TR-113 ..... N83-12349 #
CUED/A-TURBO/TR-116 ..... N83-12350 #

DC-L2-04264 ..... N83-12487* #

DDA-EDR-10327 ..... N83-12431* #

DELET-TR-81-0381-F ..... N83-12537 #

DE81-701030 ..... N83-12962 #
DE82-001145 ..... N83-13041 #
DE82-002062 ..... N83-13020 #
DE82-002758 ..... N83-12560 #
DE82-003062 ..... N83-12438 #
DE82-003222 ..... N83-12437 #
DE82-003521 ..... N83-12984 #
DE82-004036 ..... N83-12253 #
DE82-004037 ..... N83-12254 #
DE82-004271 ..... N83-12199 #
DE82-004522 ..... N83-12343 #
DE82-004687 ..... N83-12988 #
DE82-005656 ..... N83-12905 #
DE82-006057 ..... N83-12542 #
DE82-006198 ..... N83-12659 #
DE82-006221 ..... N83-12545 #
DE82-006236 ..... N83-12543 #
DE82-006935 ..... N83-12914 #
DE82-007247 ..... N83-12559 #
DE82-008030 ..... N83-12660 #
DE82-008203 ..... N83-12480 #
DE82-010043 ..... N83-12112 #
DE82-012428 ..... N83-12552 #
DE82-013674 ..... N83-13007 #
DE82-013848 ..... N83-12836 #
DE82-013922 ..... N83-12473 #
DE82-015400 ..... N83-12565 #
DE82-015605 ..... N83-12950 #
DE82-015626 ..... N83-12566 #
DE82-015755 ..... N83-12703 #
DE82-016179 ..... N83-12562 #
DE82-016270 ..... N83-12564 #
DE82-016369 ..... N83-13008 #
DE82-016616 ..... N83-13006 #
DE82-016958 ..... N83-13005 #
DE82-016999 ..... N83-12563 #
DE82-017394 ..... N83-12788 #
DE82-018228 ..... N83-13021 #
DE82-018272 ..... N83-12226 #
DE82-018575 ..... N83-12951 #
DE82-018598 ..... N83-12584 #
DE82-018786 ..... N83-12204 #
DE82-018816 ..... N83-12440 #
DE82-018916 ..... N83-12705 #
DE82-019285 ..... N83-12429 #
DE82-019781 ..... N83-12561 #
DE82-020051 ..... N83-12222 #
DE82-020058 ..... N83-12963 #
DE82-020061 ..... N83-12658 #
DE82-020077 ..... N83-12544 #

DE82-020106 ..... N83-12949 #
DE82-020115 ..... N83-12243 #
DE82-020117 ..... N83-12428 #
DE82-020118 ..... N83-12386 #
DE82-020119 ..... N83-12551 #
DE82-020120 ..... N83-12915 #
DE82-020138 ..... N83-12946 #
DE82-020194 ..... N83-13043 #
DE82-020255 ..... N83-12557 #
DE82-020273 ..... N83-12558 #
DE82-020276 ..... N83-13002 #
DE82-020277 ..... N83-13003 #
DE82-020362 ..... N83-12947 #
DE82-020364 ..... N83-12281 #
DE82-020365 ..... N83-13004 #
DE82-020368 ..... N83-12170 #
DE82-020394 ..... N83-12549 #
DE82-020398 ..... N83-12553 #
DE82-020399 ..... N83-12555 #
DE82-020400 ..... N83-12556 #
DE82-020414 ..... N83-12786 #
DE82-020416 ..... N83-12785 #
DE82-020420 ..... N83-12550 #
DE82-020422 ..... N83-12904 #
DE82-020426 ..... N83-12427 #
DE82-020466 ..... N83-12903 #
DE82-020468 ..... N83-12342 #
DE82-020475 ..... N83-12983 #
DE82-020486 ..... N83-12948 #
DE82-020493 ..... N83-12255 #
DE82-020506 ..... N83-12547 #
DE82-020596 ..... N83-12704 #
DE82-020599 ..... N83-12573 #
DE82-020608 ..... N83-12572 #
DE82-020632 ..... N83-12541 #
DE82-020704 ..... N83-12223 #
DE82-020783 ..... N83-12554 #
DE82-020885 ..... N83-12546 #
DE82-020887 ..... N83-12945 #
DE82-020924 ..... N83-12548 #
DE82-020961 ..... N83-12512 #
DE82-021010 ..... N83-12571 #
DE82-021092 ..... N83-12906 #
DE82-021120 ..... N83-13001 #
DE82-021123 ..... N83-12570 #
DE82-021127 ..... N83-12224 #
DE82-021143 ..... N83-12583 #
DE82-021216 ..... N83-12582 #
DE82-021236 ..... N83-12387 #
DE82-021253 ..... N83-12430 #
DE82-021259 ..... N83-12907 #
DE82-021260 ..... N83-12916 #
DE82-021271 ..... N83-12908 #
DE82-021297 ..... N83-12576 #
DE82-021299 ..... N83-12575 #
DE82-021300 ..... N83-12574 #
DE82-021301 ..... N83-12586 #
DE82-021302 ..... N83-12577 #
DE82-021303 ..... N83-12579 #
DE82-021316 ..... N83-12661 #
DE82-021359 ..... N83-12588 #
DE82-021611 ..... N83-12587 #
DE82-021612 ..... N83-12200 #
DE82-021614 ..... N83-12513 #
DE82-021698 ..... N83-12538 #
DE82-021701 ..... N83-12539 #
DE82-021702 ..... N83-12787 #
DE82-021703 ..... N83-12540 #
DE82-021737 ..... N83-12402 #
DE82-021835 ..... N83-12344 #
DE82-021841 ..... N83-12578 #
DE82-021878 ..... N83-12581 #
DE82-021951 ..... N83-12706 #
DE82-021954 ..... N83-12569 #
DE82-021956 ..... N83-12568 #
DE82-021960 ..... N83-12203 #
DE82-021977 ..... N83-12201 #
DE82-021997 ..... N83-12567 #
DE82-022154 ..... N83-12580 #

DL/SCI/P-306T ..... N83-12985 #

DOE/ARS-3707-20741/81-1 ..... N83-12564 #

DOE/BETC/TPR-82/1 ..... N83-12202 #

DOE/BP-125 ..... N83-12557 #

DOE/CS-20245/2-VOL-1 ..... N83-13041 #
DOE/CS-24312/4 ..... N83-12580 #
DOE/CS-56051/7 ..... N83-12255 #

DOE/DP-40105/1 ..... N83-13020 #
DOE/DP-40141/1 ..... N83-12429 #

DOE/EP-0032 ..... N83-12659 #

DOE/ER-0120 ..... N83-12480 #
DOE/ER-40048/5L2 ..... N83-13043 #
DOE/ER-70067-T1 ..... N83-12552 #

DOE/ET-5054/4 ..... N83-12561 #
DOE/ET-10015/70 ..... N83-13005 #
DOE/ET-10340/119 ..... N83-12437 #
DOE/ET-13511-T10 ..... N83-12438 #
DOE/ET-20279-220 ..... N83-12553 #
DOE/ET-20279/189 ..... N83-12570 #
DOE/ET-20279/197 ..... N83-12556 #
DOE/ET-20279/201 ..... N83-12547 #
DOE/ET-20279/202 ..... N83-12555 #
DOE/ET-20279/207 ..... N83-12568 #
DOE/ET-20279/209 ..... N83-12554 #
DOE/ET-20279/214 ..... N83-12569 #
DOE/ET-27133-T2-VOL-1 ..... N83-12544 #
DOE/ET-28341/T1 ..... N83-12704 #
DOE/ET-28406/1 ..... N83-12541 #
DOE/ET-51013/41 ..... N83-13007 #
DOE/ET-51013/46 ..... N83-12950 #

DOE/GFETC/RI-82/2 ..... N83-12201 #

DOE/MC-14129/1208 ..... N83-12204 #

DOE/NASA-0006-1 ..... N83-12215* #
DOE/NASA-0167-81-2 ..... N83-13038* #
DOE/NASA-51040-37 ..... N83-12359* #

DOE/NASA/0091-2 ..... N83-12250* #
DOE/NASA/0161-9A ..... N83-12524* #
DOE/NASA/0168-80/1 ..... N83-12431* #

DOE/NBM-2021316 ..... N83-12661 #

DOE/NV-10220/1 ..... N83-12584 #

DOE/PC-30304/3 ..... N83-12199 #

DOE/PE/70045-T3 ..... N83-12440 #

DOE/RA-50299-1119-VOL-4 ..... N83-12542 #

DOE/R5-10301/1-FINAL ..... N83-12788 #

DOE/S-0010-82 ..... N83-12581 #

DOT/FAA-CT-82-5 ..... N83-12062 #
DOT/FAA-CT-82-19 ..... N83-12246* #
DOT/FAA-CT-82-21 ..... N83-12060 #
DOT/FAA-CT-82-39 ..... N83-12063 #
DOT/FAA-CT-82-56-I ..... N83-12854 #
DOT/FAA-CT-82-56-III ..... N83-12855 #
DOT/FAA-CT-82-73 ..... N83-12083 #

DOT/FAA-EM-82-14 ..... N83-12083 #

DOT/FAA-RD-80-121 ..... N83-12101 #
DOT/FAA-RD-82-16 ..... N83-12065 #
DOT/FAA-RD-82-23 ..... N83-12063 #
DOT/FAA-RD-82-38 ..... N83-12060 #
DOT/FAA-RD-82-45-1 ..... N83-12299 #
DOT/FAA-RD-82-67 ..... N83-12058 #

DP-1630 ..... N83-12658 #

DREO-TN-82-13 ..... N83-12382 #

DTNSRDC-82/033 ..... N83-12435 #

D6-IPAD-70012-D ..... N83-12073* #

E-209 ..... N83-12432* #
E-1103 ..... N83-12359* #
E-1125 ..... N83-12449* #
E-1206 ..... N83-12360* #
E-1267 ..... N83-12433* #
E-1268 ..... N83-12092* #
E-1302 ..... N83-12090* #
E-1330 ..... N83-12087* #
E-1339 ..... N83-12357* #
E-1361 ..... N83-12175* #
E-1371 ..... N83-12182* #
E-1432 ..... N83-12142* #
E-1437 ..... N83-12181* #
E-1441 ..... N83-12141* #
E-1443 ..... N83-12091* #
E-1446 ..... N83-12358* #
E-1447 ..... N83-12966* #
E-1449 ..... N83-12143* #
E-1484 ..... N83-12930* #

ECAC-CR-82-048 ..... N83-12300 #

EDR-10696 ..... N83-12089* #

EL-4 ..... N83-12702* #

ENPU-80-11 ..... N83-12712 #

EPA-450/2-82-001 ..... N83-12673 #
EPA-600/2-82-020 ..... N83-12664 #
EPA-600/2-82-023 ..... N83-12670 #
EPA-600/3-82-003 ..... N83-12674 #
EPA-600/3-82-006 ..... N83-12715 #
EPA-600/3-82-011 ..... N83-12814 #
EPA-600/3-82-030 ..... N83-12669 #
EPA-600/4-81-064-PT-1 ..... N83-12404 #
EPA-600/7-82-009 ..... N83-12667 #
EPA-600/7-82-026 ..... N83-12668 #

EPA/DF-82-003A ..... N83-12040 #
EPA/DF-82-003B ..... N83-12041 #

EPA/SW-846C ..... N83-12210 #

EPRI-EM-2193-VOL-3 ..... N83-12559 #
EPRI-EM-2210-VOL-4 ..... N83-12561 #

ERDA-81-16 ..... N83-12327 #

ERIM-148000-1-F ..... N83-12303* #
ERIM-160300-18-P ..... N83-12500* #
ERIM-160300-19-T ..... N83-12501* #

ERR-0195 ..... N83-12971 #

ESD-TR-82-010 ..... N83-13015 #
ESD-TR-82-125 ..... N83-12869 #

EW-U2-04298 ..... N83-12488* #
EW-U2-04319 ..... N83-12482* #
EW-U2-04327 ..... N83-12492* #
EW-U2-04328 ..... N83-12489* #

E83-10002 ..... N83-12482* #
E83-10003 ..... N83-12483* #
E83-10004 ..... N83-12484* #
E83-10005 ..... N83-12485* #
E83-10006 ..... N83-12486* #
E83-10007 ..... N83-12866* #
E83-10008 ..... N83-12487* #
E83-10009 ..... N83-12488* #
E83-10010 ..... N83-12489* #
E83-10011 ..... N83-12490* #
E83-10012 ..... N83-12491* #
E83-10013 ..... N83-12492* #
E83-10014 ..... N83-12493* #
E83-10015 ..... N83-12494* #
E83-10016 ..... N83-12499* #
E83-10017 ..... N83-12500* #
E83-10018 ..... N83-12501* #
E83-10019 ..... N83-12502* #
E83-10020 ..... N83-12503* #
E83-10021 ..... N83-12504* #
E83-10022 ..... N83-12505* #
E83-10023 ..... N83-12506* #
E83-10024 ..... N83-12507* #

FAA-AP-82-2 ..... N83-12069 #

FAA-ASF-300-82-2 ..... N83-12055 #

FAA-CT-81-56 ..... N83-12718 #
FAA-CT-81-72 ..... N83-12059 #
FAA-CT-82-20 ..... N83-12248* #
FAA-CT-82-31 ..... N83-12298 #
FAA-CT-82-66 ..... N83-12853 #
FAA-CT-82-72 ..... N83-12247 #
FAA-CT-82-83 ..... N83-12237* #

FAA-EM-81-13 ..... N83-12853 #

FAA-RD-81-103 ..... N83-12867 #
FAA-RD-82-6 ..... N83-12061 #
FAA-RD-82-7 ..... N83-12059 #
FAA-RD-82-12 ..... N83-12066 #
FAA-RD-82-12 ..... N83-12067 #
FAA-RD-82-32 ..... N83-12718 #
FAA-RD-82-40 ..... N83-12068 #
FAA-RD-82-54 ..... N83-12064 #
FAA-RD-82-58 ..... N83-12297 #
FAA-RD-82-63 ..... N83-12300 #
FAA-RD-82-64 ..... N83-12719 #

FCTC-18-106 ..... N83-12873 #
FCTC-81-39 ..... N83-12875 #
FCTC-81-110 ..... N83-12878 #
FCTC-81-116 ..... N83-12874 #
FCTC-81-126 ..... N83-12910 #
FCTC-81-137 ..... N83-12872 #
FCTC-81-139 ..... N83-12877 #

FCTC-81-140 ..... N83-12909 #
FCTC-81-147 ..... N83-12911 #

FHWA-CO-81-11 ..... N83-12390 #

FHWA/RD-81/S01193 ..... N83-12475 #

FHWA/TX-81/38 ..... N83-12477 #

FHWA/VA-82/30 ..... N83-12284 #

FNP-400-82-15 ..... N83-13023 #

FSGTR/INT-78 ..... N83-12079 #

GARP-FOR-1 ..... N83-12794 #
GARP-FOR-3 ..... N83-12806 #
GARP-FOR-4 ..... N83-12807 #
GARP-FOR-5 ..... N83-12808 #
GARP-FOR-8 ..... N83-12796 #

GARP-PUB-SER-25 ..... N83-12724 #

GARP-PUBL-SER-24 ..... N83-12798 #

GARP-SPEC-REPT-38 ..... N83-12707 #
GARP-SPEC-REPT-39 ..... N83-12804 #

GIT-ICS-82/10 ..... N83-12896 #

GIT/EES-A-2832 ..... N83-12319 #

GJBX-156-82 ..... N83-12512 #
GJBX-195-82-VOL-1 ..... N83-12513 #

GPO-86-217 ..... N83-12521 #

GRI-79/0103.2 ..... N83-12593 #
GRI-79/0113 ..... N83-12208 #
GRI-79/01031 ..... N83-12590 #
GRI-80/0094 ..... N83-12665 #
GRI-80/0095 ..... N83-12666 #
GRI-80/0109 ..... N83-12708 #
GRI-81/0026 ..... N83-12256 #
GRI-81/0027 ..... N83-12592 #
GRI-81/0036 ..... N83-12206 #

GTEC-31-3725(2) ..... N83-13038* #

HAC-FR-81-70-778 ..... N83-12338 #

HDL-CR-81-017-1 ..... N83-12341 #
HDL-CR-82-116-2 ..... N83-12941 #

HHA-81-4 ..... N83-12069 #

HHL-TR-69 ..... N83-12518 #

HMA-1-82 ..... N83-12403 #

IAEA-RL-84 ..... N83-12962 #

IFAORS-189 ..... N83-12682* #

IITRI-M8004-36 ..... N83-12215* #

INPE-2364-PRE/097 ..... N83-12922 #
INPE-2369-PRE/409 ..... N83-12328 #
INPE-2373-NTE/183 ..... N83-12294 #
INPE-2387-PRE/107 ..... N83-12123 #
INPE-2388-PRE/108 ..... N83-12124 #
INPE-2389-PRE/109 ..... N83-12125 #
INPE-2401-PRE/115 ..... N83-12921 #
INPE-2402-TDL/089 ..... N83-12295 #
INPE-2439-PRE/140 ..... N83-12990 #
INPE-2449-PRE/147 ..... N83-13046 #
INPE-2450-PRE/148 ..... N83-12923 #
INPE-2478-PRE/164 ..... N83-12301 #
INPE-2492-PRE/175 ..... N83-12677 #
INPE-2493-PRE/176 ..... N83-12407 #
INPE-2494-TDL/097 ..... N83-12723 #
INPE-2495-PRE/178 ..... N83-12392 #
INPE-2496-PRE/179 ..... N83-12965 #
INPE-2497-PRE/180 ..... N83-12679 #
INPE-2498-PRE/181 ..... N83-12929 #
INPE-2499-NTE/190 ..... N83-12883 #
INPE-2500-PRE/182 ..... N83-12681 #
INPE-2501-NTE/191 ..... N83-12307 #
INPE-2502-PRE/183 ..... N83-12680 #
INPE-2503-PRE/184 ..... N83-12685 #
INPE-2504-PRE/185 ..... N83-12126 #
INPE-2505-PRE/186 ..... N83-12127 #
INPE-2507-PRE/187 ..... N83-12249 #
INPE-2509-PRE/188 ..... N83-12596 #
INPE-2510-PRE/189 ..... N83-12302 #
INPE-2511-PRE/190 ..... N83-12684 #

INPE-2512-PRE/191 ..... N83-12351 #
INPE-2513-PRE/192 ..... N83-12686 #
INPE-2514-PRE/193 ..... N83-12509 #
INPE-2515-NTE/192 ..... N83-12691 #
INPE-2516-TDL/09 ..... N83-13010 #
INPE-2519-PRE/194-PT-2 ..... N83-12717 #
INPE-2522-RPE/414 ..... N83-12694 #
INPE-2529-RPE/417 ..... N83-12597 #
INPE-2531-PRE/198 ..... N83-12678 #
INPE-2533-PRE/199 ..... N83-12296 #
INPE-2534-TDL/101 ..... N83-12720 #
INPE-2538-PRE/201 ..... N83-12689 #
INPE-2539-TDL/102 ..... N83-13045 #
INPE-2540-PRE/202 ..... N83-12688 #
INPE-2541-PRE/203 ..... N83-12683 #
INPE-2543-PRE/203 ..... N83-12827 #
INPE-2545-RPE/419 ..... N83-12128 #
INPE-2546-RPE/420 ..... N83-12722 #
INPE-2547-RPE/421 ..... N83-12721 #
INPE-2548-PRE/205 ..... N83-12180 #
INPE-2549-RPE/422 ..... N83-12692 #
INPE-2550-PRE/206 ..... N83-12687 #
INPE-2554-RPE/418 ..... N83-12331 #
INPE-2556-TDL/103 ..... N83-12690 #
INPE-2558-TDL/104 ..... N83-12520 #
INPE-20508-TDL/098 ..... N83-12917 #

IPPJ-AM-23 ..... N83-12977 #

IPPJ-608 ..... N83-12995 #
IPPJ-609 ..... N83-12996 #
IPPJ-610 ..... N83-12997 #

IR-5 ..... N83-13014 #
IR-576 ..... N83-12876 #

IRT-8195-018-VOL-1 ..... N83-12136* #
IRT-8195-022-1-VOL-2 ..... N83-12137* #

IS-4792 ..... N83-12226 #

ISBN-0-643-03015-8 ..... N83-12676 #
ISBN-90-6196-174-2 ..... N83-12927 #
ISBN-90-6196-230-7 ..... N83-12926 #
ISBN-90-6196-231-5 ..... N83-12928 #
ISBN-90-6196-233-1 ..... N83-12925 #
ISBN-90-6196-235-8 ..... N83-12924 #
ISBN-92-63-00596-6 ..... N83-12736 #
ISBN-92-63-10519-7 ..... N83-12790 #
ISBN-92-63-10519-7 ..... N83-12791 #
ISBN-92-63-10542-1 ..... N83-12792 #
ISBN-92-63-10550-2 ..... N83-12989 #
ISBN-92-63-10559-6 ..... N83-12514 #
ISBN-92-63-10560-X ..... N83-12797 #
ISBN-92-63-10562-6 ..... N83-12793 #
ISBN-92-63-10563-4 ..... N83-12599 #
ISBN-92-63-10565-0 ..... N83-12789 #
ISBN-92-63-10573-1 ..... N83-12795 #
ISBN-92-63-10580-4 ..... N83-12515 #
ISBN-92-63-10581-9 ..... N83-12662 #
ISBN-92-63-10583-2 ..... N83-12663 #
ISBN-92-63-10584-7 ..... N83-12803 #
ISBN-92-63-10586-3 ..... N83-12805 #
ISBN-92-63-10587-1 ..... N83-12516 #
ISBN-92-63-10589-8 ..... N83-12809 #
ISBN-92-63-12544-9 ..... N83-12801 #
ISBN-92-63-16240-9 ..... N83-12810* #
ISBN-92-63-20571-X ..... N83-12799 #
ISBN-92-63-20582-5 ..... N83-12802 #

ISSN-92-63-10592-8 ..... N83-12811 #
ISSN-0080-7348 ..... N83-12716 #
ISSN-0208-5658 ..... N83-12171 #
ISSN-0208-5658 ..... N83-12211 #
ISSN-0208-5658 ..... N83-12236 #
ISSN-0208-5658 ..... N83-12291 #
ISSN-0208-5658 ..... N83-12444 #
ISSN-0208-5658 ..... N83-12964 #
ISSN-0243-0177 ..... N83-12081 #
ISSN-0243-0177 ..... N83-12976 #
ISSN-0252-1075 ..... N83-12824 #
ISSN-0252-1075 ..... N83-12825 #
ISSN-0309-6521 ..... N83-12349 #
ISSN-0309-6521 ..... N83-12350 #
ISSN-0389-4010 ..... N83-12043 #
ISSN-0389-4010 ..... N83-12086 #
ISSN-0389-4010 ..... N83-12120 #
ISSN-0389-4010 ..... N83-12121 #
ISSN-0389-4010 ..... N83-12139 #
ISSN-0389-4010 ..... N83-12140 #
ISSN-0389-4010 ..... N83-12346 #
ISSN-0389-4010 ..... N83-12347 #
ISSN-0389-4010 ..... N83-12348 #
ISSN-0389-4010 ..... N83-12391 #
ISSN-0389-4010 ..... N83-12522 #

IT-E2-04310 ..... N83-12501* #
IT-E2-04311 ..... N83-12500* #

IT-T2-04323 ..... N83-12505* #

ITJ2-04267 ..... N83-12486* #

JHU/APL-CP-084 ..... N83-12326 #

JO-19128 ..... N83-12330* #

JPL-PUB-82-40 ..... N83-12246* #

JPL-PUBL-82-53 ..... N83-12248* #

JPL-5030-543 ..... N83-12237* #

JSC-13821-VOL-1-REV-A ..... N83-12866* #
JSC-16747 ..... N83-12490* #
JSC-17829 ..... N83-12487* #
JSC-17830 ..... N83-12486* #
JSC-18241 ..... N83-12488* #
JSC-18245 ..... N83-12483* #
JSC-18254 ..... N83-12482* #
JSC-18257 ..... N83-12493* #
JSC-18258 ..... N83-12492* #
JSC-18259 ..... N83-12489* #

L-15433 ..... N83-12595* #
L-15439 ..... N83-12133* #
L-15508 ..... N83-12070* #
L-15510 ..... N83-12395* #
L-15537 ..... N83-12147* #

LA-9087-PR ..... N83-12988 #
LA-9111-M-REV ..... N83-12907 #
LA-9143-MS ..... N83-12112 #
LA-9342-PR ..... N83-12344 #
LA-9421-MS ..... N83-12578 #
LA-9489-MS ..... N83-12430 #
LA-9501-MS ..... N83-12908 #
LA-9503-MS ..... N83-12916 #

LARS-052680 ..... N83-12504* #
LARS-113081 ..... N83-12506* #

LBL-14305 ..... N83-12573 #
LBL-14674 ..... N83-12572 #

LC-81-600162 ..... N83-13022 #
LC-82-600515 ..... N83-12861 #

LEMSCO-12653-VOL-1-REV-A ..... N83-12866* #
LEMSCO-15128 ..... N83-12490* #
LEMSCO-17597 ..... N83-12487* #
LEMSCO-17765 ..... N83-12493* #

LG82ER0031 ..... N83-12968* #

M-989-82-05 ..... N83-12134* #

MAE-1571 ..... N83-12051 #

MAI-81 ..... N83-12285 #

MANPA-471(82) ..... N83-12146 #

MATH-CENTRE-TRACT-105 ..... N83-12927 #
MATH-CENTRE-TRACT-146 ..... N83-12925 #

MBSIR-81-2450 ..... N83-12389 #

MDC-J2548 ..... N83-12047* #

MDC-Q0767 ..... N83-12052 #

MEF/4068 ..... N83-12289 #

MERADCOM-2356 ..... N83-13040 #

MIT-MVLR-MVT-80-1 ..... N83-12847* #

MIT/EL-81-043 ..... N83-12591 #

MRC-DA-1096-VOL-1 ..... N83-12580 #
MRC-DA-1101 ..... N83-12190 #

MRC-TSR-2389 ..... N83-12937 #
MRC-TSR-2390 ..... N83-12938 #
MRC-TSR-2391 ..... N83-12381 #
MRC-TSR-2392 ..... N83-12942 #
MRC-TSR-2393 ..... N83-12939 #
MRC-TSR-2394 ..... N83-12940 #

MRL-R-805 ..... N83-12245 #
MRL-R-858 ..... N83-12842 #

MTPR-11 ..... N83-12088* #

MTR-8426 ..... N83-12869 #

NA-81-234-VOL-1 ..... N83-12077 #
NA-81-234-VOL-2 ..... N83-12078 #

NAL-TR-692 ..... N83-12346 #
NAL-TR-693 ..... N83-12043 #
NAL-TR-694 ..... N83-12139 #
NAL-TR-695 ..... N83-12120 #
NAL-TR-696 ..... N83-12140 #
NAL-TR-697 ..... N83-12391 #
NAL-TR-698 ..... N83-12522 #
NAL-TR-699 ..... N83-12084 #
NAL-TR-700 ..... N83-12085 #
NAL-TR-701 ..... N83-12347 #
NAL-TR-703 ..... N83-12086 #
NAL-TR-704 ..... N83-12121 #
NAL-TR-709 ..... N83-12348 #

NAMRL-1284 ..... N83-12846 #

NAS 1.15:76955 ..... N83-12848* #
NAS 1.15:76956 ..... N83-12849* #
NAS 1.15:81374 ..... N83-12881* #
NAS 1.15:81695 ..... N83-12432* #
NAS 1.15:82774 ..... N83-12359* #
NAS 1.15:82890 ..... N83-12092* #
NAS 1.15:82932 ..... N83-12087* #
NAS 1.15:82949 ..... N83-12090* #
NAS 1.15:82951 ..... N83-12175* #
NAS 1.15:82954 ..... N83-12182* #
NAS 1.15:82956 ..... N83-12433* #
NAS 1.15:82969 ..... N83-12357* #
NAS 1.15:83001 ..... N83-12181* #
NAS 1.15:83003 ..... N83-12091* #
NAS 1.15:83004 ..... N83-12141* #
NAS 1.15:83011 ..... N83-12358* #
NAS 1.15:83012 ..... N83-12966* #
NAS 1.15:83014 ..... N83-12142* #
NAS 1.15:83015 ..... N83-12143* #
NAS 1.15:83039 ..... N83-12930* #
NAS 1.15:83910 ..... N83-12306* #
NAS 1.15:83969 ..... N83-12396* #
NAS 1.15:83981 ..... N83-12879* #
NAS 1.15:83986 ..... N83-13042* #
NAS 1.15:83993 ..... N83-12829* #
NAS 1.15:83999 ..... N83-12882* #
NAS 1.15:84000 ..... N83-12998* #
NAS 1.15:84003 ..... N83-12693* #
NAS 1.15:84244 ..... N83-12507* #
NAS 1.15:84245-VOL-2 ..... N83-12048* #
NAS 1.15:84299 ..... N83-12173* #
NAS 1.15:84300 ..... N83-12393* #
NAS 1.15:84469 ..... N83-12356* #
NAS 1.15:84529 ..... N83-12133* #
NAS 1.15:84545 ..... N83-12070* #
NAS 1.15:84552 ..... N83-12174* #
NAS 1.15:84556 ..... N83-12395* #
NAS 1.15:84878 ..... N83-12486* #
NAS 1.15:84889 ..... N83-12134* #
NAS 1.15:84890 ..... N83-12132* #
NAS 1.15:84898 ..... N83-12135* #
NAS 1.15:84929 ..... N83-13047* #
NAS 1.15:85126 ..... N83-12702* #
NAS 1.21:7037(152) N83-12038*
NAS 1.26:2984 ..... N83-12073* #
NAS 1.26:3538 ..... N83-12968* #
NAS 1.26:3624 ..... N83-12093* #
NAS 1.26:3631 ..... N83-12865* #
NAS 1.26:3633 ..... N83-12959* #
NAS 1.26:3636 ..... N83-12049* #
NAS 1.26:3638 ..... N83-12682* #
NAS 1.26:3645 ..... N83-12352* #
NAS 1.26:152344 ..... N83-12099* #
NAS 1.26:152362 ..... N83-12072* #
NAS 1.26:159859 ..... N83-12094* #
NAS 1.26:159877 ..... N83-12259* #
NAS 1.26:165178 ..... N83-12431* #
NAS 1.26:165209 ..... N83-12215* #
NAS 1.26:165282 ..... N83-12330* #
NAS 1.26:165296 ..... N83-12089* #
NAS 1.26:165329 ..... N83-13038* #
NAS 1.26:165390 ..... N83-12044* #
NAS 1.26:165394 ..... N83-13009* #
NAS 1.26:165462-A ..... N83-12524* #
NAS 1.26:165571 ..... N83-12451* #
NAS 1.26:165590 ..... N83-12137* #
NAS 1.26:165863 ..... N83-12863* #
NAS 1.26:165864 ..... N83-12864* #
NAS 1.26:165952 ..... N83-12071* #
NAS 1.26:165955 ..... N83-12450* #
NAS 1.26:165974 ..... N83-12394* #
NAS 1.26:165990 ..... N83-12136* #
NAS 1.26:165992 ..... N83-12523* #
NAS 1.26:165994 ..... N83-12102* #
NAS 1.26:167646 ..... N83-12484* #
NAS 1.26:167648 ..... N83-12491* #
NAS 1.26:167701 ..... N83-12494* #
NAS 1.26:167718 ..... N83-12499* #
NAS 1.26:167720 ..... N83-12493* #
NAS 1.26:167721 ..... N83-12506* #
NAS 1.26:167728 ..... N83-12502* #
NAS 1.26:167729 ..... N83-12501* #
NAS 1.26:167748 ..... N83-12503* #
NAS 1.26:167752 ..... N83-12487* #
NAS 1.26:167754 ..... N83-12490* #
NAS 1.26:167755 ..... N83-12866* #
NAS 1.26:167756 ..... N83-12109* #
NAS 1.26:167757 ..... N83-12305* #
NAS 1.26:167889 ..... N83-12144* #
NAS 1.26:167889 ..... N83-12145* #
NAS 1.26:167903 ..... N83-12129* #
NAS 1.26:167917 ..... N83-12250* #
NAS 1.26:167979 ..... N83-12967* #
NAS 1.26:167990-VOL-1 ..... N83-12353* #
NAS 1.26:167990-VOL-2 ..... N83-12354* #
NAS 1.26:168003 ..... N83-12045* #
NAS 1.26:168009 ..... N83-12047* #
NAS 1.26:169384 ..... N83-12237* #
NAS 1.26:169385 ..... N83-12246* #
NAS 1.26:169386 ..... N83-13024* #
NAS 1.26:169387 ..... N83-13049* #
NAS 1.26:169388 ..... N83-12248* #
NAS 1.26:169471 ..... N83-12303* #
NAS 1.26:169472 ..... N83-12847* #
NAS 1.26:169473 ..... N83-12828* #
NAS 1.26:169474 ..... N83-12214* #
NAS 1.26:169475 ..... N83-12088* #
NAS 1.26:169476 ..... N83-12880* #
NAS 1.26:169477 ..... N83-12046* #
NAS 1.26:169478 ..... N83-12213* #
NAS 1.26:169479 ..... N83-12304* #
NAS 1.26:169480 ..... N83-12355* #
NAS 1.26:169481 ..... N83-12329* #
NAS 1.26:169482 ..... N83-12868* #
NAS 1.26:169490 ..... N83-12489* #
NAS 1.26:169491 ..... N83-12488* #
NAS 1.26:169493 ..... N83-12482* #
NAS 1.55:2249 ..... N83-12452* #
NAS 1.55:2251 ..... N83-12147* #
NAS 1.60:2055 ..... N83-12449* #
NAS 1.60:2062 ..... N83-12360* #
NAS 1.60:2076 ..... N83-12595* #
NAS 1.60:2089 ..... N83-13048* #

NASA-CASE-ARC-11372-1 ..... N83-12098* #
NASA-CASE-ARC-11405-1 ..... N83-12239* #

NASA-CASE-GSC-12771-1 ..... N83-12361* #
NASA-CASE-GSC-12773-1 ..... N83-12332* #
NASA-CASE-GSC-12788-1 ..... N83-12333* #
NASA-CASE-GSC-12794-1 ..... N83-12434* #
NASA-CASE-GSC-12812-1 ..... N83-12525* #

NASA-CASE-JPO-15432-1 ..... N83-12308* #

NASA-CASE-LAR-12728-1 ..... N83-12398* #
NASA-CASE-LAR-12966-I ..... N83-12969* #
NASA-CASE-LAR-12967-1 ..... N83-12397* #

NASA-CASE-LEW-13758-1 ..... N83-12176* #

NASA-CASE-MFS-25319-1 ..... N83-12932* #
NASA-CASE-MFS-25878-1 ..... N83-12138* #

NASA-CASE-NPO-15553-1 ..... N83-12335* #
NASA-CASE-NPO-15844-1 ..... N83-12992* #
NASA-CASE-NPO-15851-1 ..... N83-12986* #
NASA-CASE-NPO-15865-1 ..... N83-12991* #
NASA-CASE-NPO-15935-1 ..... N83-12334* #

NASA-CP-2249 ..... N83-12452* #
NASA-CP-2251 ..... N83-12147* #

NASA-CR-2984 ..... N83-12073* #
NASA-CR-3538 ..... N83-12968* #
NASA-CR-3624 ..... N83-12093* #
NASA-CR-3631 ..... N83-12865* #
NASA-CR-3633 ..... N83-12959* #
NASA-CR-3636 ..... N83-12049* #
NASA-CR-3638 ..... N83-12682* #
NASA-CR-3645 ..... N83-12352* #
NASA-CR-152344 ..... N83-12099* #
NASA-CR-152362 ..... N83-12072* #
NASA-CR-159859 ..... N83-12094* #
NASA-CR-159877 ..... N83-12259* #
NASA-CR-165178 ..... N83-12431* #
NASA-CR-165209 ..... N83-12215* #
NASA-CR-165282 ..... N83-12330* #
NASA-CR-165296 ..... N83-12089* #
NASA-CR-165329 ..... N83-13038* #
NASA-CR-165390 ..... N83-12044* #
NASA-CR-165394 ..... N83-13009* #
NASA-CR-165462-A ..... N83-12524* #
NASA-CR-165571 ..... N83-12451* #
NASA-CR-165590 ..... N83-12136* #
NASA-CR-165590 ..... N83-12137* #
NASA-CR-165863 ..... N83-12863* #
NASA-CR-165864 ..... N83-12864* #
NASA-CR-165952 ..... N83-12071* #
NASA-CR-165955 ..... N83-12450* #
NASA-CR-165974 ..... N83-12394* #
NASA-CR-165992 ..... N83-12523* #
NASA-CR-165994 ..... N83-12102* #
NASA-CR-167646 ..... N83-12484* #
NASA-CR-167648 ..... N83-12491* #
NASA-CR-167700 ..... N83-12505* #
NASA-CR-167701 ..... N83-12494* #
NASA-CR-167702 ..... N83-12500* #
NASA-CR-167713 ..... N83-12485* #
NASA-CR-167718 ..... N83-12499* #
NASA-CR-167720 ..... N83-12493* #
NASA-CR-167721 ..... N83-12506* #
NASA-CR-167722 ..... N83-12504* #
NASA-CR-167728 ..... N83-12502* #
NASA-CR-167729 ..... N83-12501* #
NASA-CR-167748 ..... N83-12503* #
NASA-CR-167752 ..... N83-12487* #
NASA-CR-167754 ..... N83-12490* #
NASA-CR-167755 ..... N83-12866* #
NASA-CR-167756 ..... N83-12109* #
NASA-CR-167757 ..... N83-12305* #
NASA-CR-167889 ..... N83-12144* #
NASA-CR-167889 ..... N83-12145* #
NASA-CR-167903 ..... N83-12129* #
NASA-CR-167917 ..... N83-12250* #
NASA-CR-167979 ..... N83-12967* #
NASA-CR-167990-VOL-1 ..... N83-12353* #
NASA-CR-167990-VOL-2 ..... N83-12354* #
NASA-CR-168003 ..... N83-12045* #
NASA-CR-168009 ..... N83-12047* #
NASA-CR-169384 ..... N83-12237* #
NASA-CR-169385 ..... N83-12246* #
NASA-CR-169386 ..... N83-13024* #
NASA-CR-169387 ..... N83-13049* #
NASA-CR-169388 ..... N83-12248* #
NASA-CR-169471 ..... N83-12303* #
NASA-CR-169472 ..... N83-12847* #
NASA-CR-169473 ..... N83-12828* #
NASA-CR-169474 ..... N83-12214* #
NASA-CR-169475 ..... N83-12088* #
NASA-CR-169476 ..... N83-12880* #
NASA-CR-169477 ..... N83-12046* #
NASA-CR-169478 ..... N83-12213* #
NASA-CR-169479 ..... N83-12304* #
NASA-CR-169480 ..... N83-12355* #
NASA-CR-169481 ..... N83-12329* #
NASA-CR-169482 ..... N83-12868* #
NASA-CR-169489 ..... N83-12492* #
NASA-CR-169490 ..... N83-12489* #
NASA-CR-169491 ..... N83-12488* #
NASA-CR-169492 ..... N83-12483* #
NASA-CR-169493 ..... N83-12482* #

NASA-SP-7037(152) N83-12038*

NASA-TM-76955 ..... N83-12848* #
NASA-TM-76956 ..... N83-12849* #
NASA-TM-81374 ..... N83-12881* #
NASA-TM-81695 ..... N83-12432* #
NASA-TM-82774 ..... N83-12359* #
NASA-TM-82890 ..... N83-12092* #
NASA-TM-82932 ..... N83-12087* #
NASA-TM-82949 ..... N83-12090* #
NASA-TM-82951 ..... N83-12175* #
NASA-TM-82954 ..... N83-12182* #
NASA-TM-82956 ..... N83-12433* #
NASA-TM-82969 ..... N83-12357* #
NASA-TM-83001 ..... N83-12181* #
NASA-TM-83003 ..... N83-12091* #
NASA-TM-83004 ..... N83-12141* #
NASA-TM-83011 ..... N83-12358* #
NASA-TM-83012 ..... N83-12966* #
NASA-TM-83014 ..... N83-12142* #
NASA-TM-83015 ..... N83-12143* #
NASA-TM-83039 ..... N83-12930* #
NASA-TM-83910 ..... N83-12306* #
NASA-TM-83969 ..... N83-12396* #
NASA-TM-83981 ..... N83-12879* #
NASA-TM-83986 ..... N83-13042* #
NASA-TM-83993 ..... N83-12829* #
NASA-TM-83999 ..... N83-12882* #
NASA-TM-84000 ..... N83-12998* #
NASA-TM-84003 ..... N83-12693* #
NASA-TM-84244 ..... N83-12507* #
NASA-TM-84245-VOL-2 ..... N83-12048* #

NASA-TM-84299 ..... N83-12173* #
NASA-TM-84300 ..... N83-12393* #
NASA-TM-84469 ..... N83-12356* #
NASA-TM-84529 ..... N83-12133* #
NASA-TM-84545 ..... N83-12070* #
NASA-TM-84552 ..... N83-12174* #
NASA-TM-84556 ..... N83-12395* #
NASA-TM-84878 ..... N83-12486* #
NASA-TM-84889 ..... N83-12134* #
NASA-TM-84890 ..... N83-12132* #
NASA-TM-84898 ..... N83-12135* #
NASA-TM-84929 ..... N83-13047* #
NASA-TM-85126 ..... N83-12702* #

NASA-TP-2055 ..... N83-12449* #
NASA-TP-2062 ..... N83-12360* #
NASA-TP-2076 ..... N83-12595* #
NASA-TP-2089 ..... N83-13048* #

NAVTRAEQUIPCEN-IH-337 ..... N83-12103 #

NBS-BSS-140-LC-81-600191 ..... N83-12287 #

NBS-GCR-82-376 ..... N83-12876 #
NBS-GCR-82-377 ..... N83-12282 #

NBS-SP-400-71 ..... N83-13022 #
NBS-SP-480-40 ..... N83-12244 #

NBSIR-81-1656 ..... N83-12345 #
NBSIR-81-2345 ..... N83-12207 #
NBSIR-81-2379 ..... N83-12589 #
NBSIR-81-2420 ..... N83-12388 #
NBSIR-82-1658 ..... N83-12470 #
NBSIR-82-2473 ..... N83-12209 #

NCAR-0306-82-1 ..... N83-12812 #

NCHRP-237 ..... N83-12283 #

NDSR-NWS-81-1 ..... N83-12818 #

NEWS-RELEASE-82-156 ..... N83-12132* #

NIH-79-302-1-VOL-1 ..... N83-13029 #
NIH-79-302-2-VOL-2 ..... N83-13030 #
NIH-79-302-3-VOL-3 ..... N83-13031 #
NIH-79-302-4-VOL-4 ..... N83-13032 #
NIH-79-302-5-VOL-5 ..... N83-13033 #
NIH-79-302-6-VOL-6 ..... N83-13034 #

NLR-MP-81014-U ..... N83-12527 #

NOAA-NWS-HR-50 ..... N83-12823 #

NOAA-TM-ERL-OWRM-7-PT-3 ..... N83-12816 #
NOAA-TM-ERL-OWRM-10-PT-6 ..... N83-12817 #
NOAA-TM-ERL-OWRM-12 ..... N83-12822 #

NOAA-TM-ERL-WMPO-46 ..... N83-12820 #

NOAA-TM-ERL-WPL-87 ..... N83-12815 #
NOAA-TM-ERL-WPL-88 ..... N83-12406 #

NOAA-TM-NESS-116 ..... N83-12131 #

NOAA-TM-NWS-AR-32 ..... N83-12710 #

NOAA-TM-OTES-2 ..... N83-12838 #

NOAA-TR-ERL-415-PMEL-34 ..... N83-12837 #

NOAA-TR-NESS-86 ..... N83-12826 #

NOAA-81122905-PT-6 ..... N83-12817 #
NOAA-81122908-PT-3 ..... N83-12816 #
NOAA-82012901 ..... N83-12820 #
NOAA-82012904 ..... N83-12826 #
NOAA-82020401 ..... N83-12823 #
NOAA-82020502 ..... N83-12818 #
NOAA-82021003-PT-2 ..... N83-13056 #
NOAA-82021901 ..... N83-12822 #
NOAA-82021905 ..... N83-12406 #
NOAA-82021908 ..... N83-12838 #
NOAA-82021909 ..... N83-12821 #
NOAA-82022204 ..... N83-12815 #
NOAA-82022502 ..... N83-12710 #
NOAA-82031105-PT-1 ..... N83-13055 #
NOAA-82031106-PT-2 ..... N83-13052 #
NOAA-82031504-PT-1 ..... N83-13050 #
NOAA-82031505-PT-2 ..... N83-13054 #
NOAA-82032901 ..... N83-12131 #

NOR-81-127 ..... N83-12044* #
NOR-82-58 ..... N83-12076 #

NORDA-TN-115 ..... N83-12834 #
NORDA-TN-150 ..... N83-12835 #
NORDA-TN-152 ..... N83-12832 #
NORDA-TN-156 ..... N83-12833 #
NORDA-TN-162 ..... N83-12511 #

NOSC-CR-112 ..... N83-12336 #

NPRDC-TR-82-47 ..... N83-12858 #

NRL-MR-4482 ..... N83-13016 #
NRL-MR-4835 ..... N83-12980 #
NRL-MR-4849 ..... N83-12309 #
NRL-MR-4864 ..... N83-12871 #
NRL-MR-4865 ..... N83-12999 #
NRL-MR-4874 ..... N83-12885 #
NRL-MR-4899 ..... N83-12695 #

NRL-8610 ..... N83-12311 #

NSF-82-57 ..... N83-13058 #

NSF/CEE-82001 ..... N83-12286 #

NSF/PRA-81020 ..... N83-13026 #
NSF/PRA-82005 ..... N83-13027 #
NSF/PRA-82007 ..... N83-13028 #

NSMRL-983 ..... N83-12859 #

NSWC/TR-82-296 ..... N83-12970 #

NWC-TP-6343 ..... N83-12217 #

N00014-76-C-0745-33 ..... N83-12189 #

OHR-13-VOL-1 ..... N83-12790 #
OHR-13-VOL-2 ..... N83-12791 #
OHR-14 ..... N83-12514 #
OHR-15 ..... N83-12797 #
OHR-19 ..... N83-12515 #
OHR-20 ..... N83-12516 #
OHR-21 ..... N83-12809 #

OMM-571 ..... N83-12799 #

ONR-ASC-82-01 ..... N83-12870 #

ONWI-106 ..... N83-12703 #
ONWI-380 ..... N83-12963 #

ORAU/IEA-82-7(M) ..... N83-12706 #

ORD-79-353 ..... N83-12667 #

ORI-TR-1799 ..... N83-12040 #

ORION-003 ..... N83-12958 #

ORNL-TM-8185 ..... N83-12906 #

ORNL-5896 ..... N83-12223 #
ORNL-5909 ..... N83-12983 #

ORNL/CSD/TM-159 ..... N83-12948 #

ORNL/TM-7851 ..... N83-12984 #
ORNL/TM-8279 ..... N83-13008 #
ORNL/TM-8320 ..... N83-12206 #

OSURF-762945/714250 ..... N83-13039 #

OTA-BR-T-10-PT-2 ..... N83-12919 #

OTA-T-170-PT-3 ..... N83-12920 #

OU/AEC-EER-54-2 ..... N83-12299 #

P-A579-F ..... N83-12719 #

PAR-82-15 ..... N83-12899 #
PAR-82-20 ..... N83-12900 #
PAR-82-21 ..... N83-12901 #

PB82-022039 ..... N83-12202 #
PB82-022074 ..... N83-12225 #
PB82-172156 ..... N83-12210 #
PB82-176678 ..... N83-12712 #
PB82-177049 ..... N83-12244 #
PB82-177312 ..... N83-12709 #
PB82-178724 ..... N83-12389 #
PB82-178989 ..... N83-12345 #
PB82-179011 ..... N83-12179 #
PB82-179946 ..... N83-12079 #
PB82-180259 ..... N83-12710 #
PB82-182098 ..... N83-12672 #
PB82-182114 ..... N83-12517 #
PB82-182379 ..... N83-12388 #
PB82-182502 ..... N83-12326 #
PB82-182676 ..... N83-12476 #
PB82-183039 ..... N83-12475 #
PB82-183146 ..... N83-12912 #
PB82-183153 ..... N83-12872 #
PB82-183179 ..... N83-12816 #
PB82-183187 ..... N83-12817 #
PB82-183575 ..... N83-13022 #
PB82-183641 ..... N83-12877 #
PB82-183732 ..... N83-12282 #
PB82-183740 ..... N83-12040 #
PB82-183757 ..... N83-12041 #
PB82-183856 ..... N83-12042 #
PB82-183989 ..... N83-12876 #
PB82-184748 ..... N83-13056 #
PB82-184763 ..... N83-12474 #
PB82-184839 ..... N83-12287 #
PB82-184862 ..... N83-12861 #
PB82-184904 ..... N83-12207 #
PB82-184920 ..... N83-12911 #
PB82-184938 ..... N83-12820 #
PB82-184953 ..... N83-12327 #
PB82-184979 ..... N83-12288 #
PB82-184995 ..... N83-12589 #
PB82-185042 ..... N83-12713 #
PB82-185125 ..... N83-12470 #
PB82-185174 ..... N83-12819 #
PB82-185315 ..... N83-12821 #
PB82-185380 ..... N83-12822 #
PB82-185406 ..... N83-12818 #
PB82-185414 ..... N83-12823 #
PB82-185430 ..... N83-12390 #
PB82-185513 ..... N83-12283 #
PB82-185638 ..... N83-12839 #
PB82-185646 ..... N83-12840 #
PB82-185653 ..... N83-12841 #
PB82-185901 ..... N83-12477 #
PB82-186461 ..... N83-12862 #
PB82-186552 ..... N83-12814 #
PB82-186578 ..... N83-12714 #
PB82-186784 ..... N83-13023 #
PB82-186800 ..... N83-12920 #
PB82-186818 ..... N83-12919 #
PB82-186875 ..... N83-12824 #
PB82-186933 ..... N83-12910 #
PB82-187220 ..... N83-13044 #
PB82-187246 ..... N83-12479 #
PB82-187261 ..... N83-12985 #
PB82-187279 ..... N83-12825 #
PB82-187808 ..... N83-12284 #
PB82-187923 ..... N83-12107 #
PB82-187931 ..... N83-12108 #
PB82-188020 ..... N83-12406 #
PB82-188053 ..... N83-12826 #
PB82-188111 ..... N83-12591 #
PB82-188113 ..... N83-13035 #
PB82-188194 ..... N83-12838 #
PB82-188301 ..... N83-12519 #
PB82-188813 ..... N83-12715 #
PB82-188830 ..... N83-12673 #
PB82-188921 ..... N83-12913 #
PB82-188947 ..... N83-13036 #
PB82-189473 ..... N83-12518 #
PB82-189564 ..... N83-12285 #
PB82-189614 ..... N83-12675 #
PB82-189648 ..... N83-12674 #
PB82-190083 ..... N83-13029 #
PB82-190091 ..... N83-13030 #
PB82-190109 ..... N83-13031 #
PB82-190117 ..... N83-13032 #
PB82-190125 ..... N83-13033 #
PB82-190133 ..... N83-13034 #
PB82-190307 ..... N83-12405 #
PB82-191081 ..... N83-12404 #
PB82-191214 ..... N83-12290 #
PB82-192592 ..... N83-12815 #
PB82-192766 ..... N83-12909 #
PB82-192964 ..... N83-12874 #
PB82-193061 ..... N83-12813 #
PB82-193178 ..... N83-12205 #
PB82-193236 ..... N83-12837 #
PB82-193269 ..... N83-12878 #
PB82-193343 ..... N83-13026 #
PB82-193681 ..... N83-12671 #
PB82-194044 ..... N83-12131 #
PB82-194152 ..... N83-12286 #
PB82-194192 ..... N83-12812 #
PB82-194473 ..... N83-13037 #
PB82-195629 ..... N83-12875 #
PB82-195637 ..... N83-12592 #
PB82-195645 ..... N83-12403 #
PB82-195686 ..... N83-12873 #
PB82-195793 ..... N83-13050 #
PB82-195801 ..... N83-13054 #

PB82-195892 ..... N83-12975 #
PB82-196296 ..... N83-12209 #
PB82-196908 ..... N83-12670 #
PB82-196916 ..... N83-12669 #
PB82-196924 ..... N83-12668 #
PB82-196932 ..... N83-12667 #
PB82-197294 ..... N83-13055 #
PB82-197302 ..... N83-13052 #
PB82-197385 ..... N83-13028 #
PB82-197393 ..... N83-13027 #
PB82-198771 ..... N83-12711 #
PB82-198995 ..... N83-12666 #
PB82-199027 ..... N83-12665 #
PB82-199035 ..... N83-12257 #
PB82-199043 ..... N83-12256 #
PB82-199704 ..... N83-12664 #
PB82-200585 ..... N83-12590 #
PB82-200593 ..... N83-12593 #
PB82-200619 ..... N83-12708 #
PB82-200637 ..... N83-12208 #
PB82-200684 ..... N83-12206 #
PB82-203837 ..... N83-12976 #
PB82-206095 ..... N83-12080 #
PB82-206855 ..... N83-12081 #
PB82-206863 ..... N83-12289 #
PB82-206871 ..... N83-12478 #
PB82-207358 ..... N83-12235 #
PB82-252743 ..... N83-12113 #
PB82-253931 ..... N83-12227 #

PCTC-82/115 ..... N83-12912 #

PFC/CP-82-5 ..... N83-13007 #

PFC/RR-82-16 ..... N83-12950 #

PIAC-97-C-6 ..... N83-12099* #

PNL-3970 ..... N83-12545 #
PNL-4283 ..... N83-12785 #
PNL-4335 ..... N83-12428 #

PRI-44 ..... N83-13002 #
PRI-46 ..... N83-13003 #

PRL/TN-81-06 ..... N83-12405 #
PRL/TN-82-01 ..... N83-12913 #

PRS/TN-81-08 ..... N83-13036 #

PSL-82-2 ..... N83-13000 #

QPR-11 ..... N83-12337 #
QPR-12 ..... N83-12337 #

QR-3 ..... N83-12199 #
QR-8 ..... N83-12524* #

QTNR-1 ..... N83-12214* #

R-036 ..... N83-12825 #

RADC-TR-82-32 ..... N83-12310 #
RADC-TR-82-79 ..... N83-12321 #
RADC-TR-82-80 ..... N83-12890 #
RADC-TR-82-113-VOL-1 ..... N83-12318 #
RADC-TR-82-113-VOL-2 ..... N83-12324 #
RADC-TR-82-113-VOL-3 ..... N83-12325 #
RADC-TR-82-128 ..... N83-12321 #
RADC-TR-82-129 ..... N83-12323 #
RADC-TR-82-148 ..... N83-12895 #
RADC-TR-82-152-VOL-1 ..... N83-12893 #
RADC-TR-82-162 ..... N83-12891 #
RADC-TR-82-172 ..... N83-12338 #
RADC-TR-82-173 ..... N83-12319 #
RADC-TR-82-179 ..... N83-12887 #
RADC-TR-82-191 ..... N83-12339 #
RADC-TR-152-VOL-2 ..... N83-12892 #

RAND/N-1536-AF ..... N83-12111 #

RAND/P-6713 ..... N83-12111 #

REPT-14-81-19 ..... N83-12858 #
REPT-44 ..... N83-12716 #
REPT-81-161-VOL-1 ..... N83-12893 #
REPT-81-161-VOL-2 ..... N83-12892 #
REPT-115 ..... N83-12698 #
REPT-144 ..... N83-12926 #
REPT-145 ..... N83-12928 #
REPT-147 ..... N83-12924 #
REPT-243-027-013 ..... N83-13018 #
REPT-262/ET-RER/80 ..... N83-12327 #
REPT-440-PT-1 ..... N83-13050 #
REPT-440-PT-2 ..... N83-13054 #
REPT-449-PT-1 ..... N83-13055 #
REPT-449-PT-2 ..... N83-13052 #
REPT-41735 ..... N83-12341 #
REPT-015224-5-1 ..... N83-12933 #

RFP-3290 ..... N83-12402 #
RFP-3305 ..... N83-12565 #

RL-81-079 ..... N83-12714 #

RR-55 ..... N83-12208 #
RR-142 ..... N83-13044 #
RR-247-2 ..... N83-12477 #

RSL-TR-360-18 ..... N83-12485* #
RSL-TR-551-2 ..... N83-12503* #

R80AEG396 ..... N83-12094* #
R81-7 ..... N83-12240 #
R82-915362-40-VOL-1 ..... N83-12353* #
R82-915362-40-VOL-2 ..... N83-12354* #
R82AEB358 ..... N83-12451* #

SAI-83-895-WA ..... N83-12784 #
SAI-254-82-219-LJ ..... N83-13003 #
SAI-254-84-174-LJ ..... N83-13002 #

SAND-80-1734 ..... N83-12904 #
SAND-81-1972 ..... N83-12705 #
SAND-81-2489 ..... N83-12903 #
SAND-81-7019-VOL-2 ..... N83-12566 #
SAND-81-7088-3 ..... N83-12543 #
SAND-81-7172 ..... N83-12548 #
SAND-81-7194 ..... N83-12562 #
SAND-82-0490 ..... N83-12915 #
SAND-82-0524 ..... N83-12222 #
SAND-82-1259 ..... N83-12342 #
SAND-82-1319 ..... N83-12951 #
SAND-82-7055 ..... N83-12224 #
SAND-82-7122 ..... N83-12550 #
SAND-82-7123 ..... N83-12551 #
SAND-82-8030 ..... N83-12546 #
SAND-82-8190 ..... N83-12386 #
SAND-82-8231 ..... N83-12945 #

SAPR-2 ..... N83-13038* #

SAR-1 ..... N83-12431* #
SAR-82-10082-02 ..... N83-13013 #

SBI-AD-E850192 ..... N83-12767 #

SER-15 ..... N83-12599 #
SER-510089 ..... N83-12071* #

SERI/PR-234-1470 ..... N83-12200 #

SERI/TR-214-1449 ..... N83-12567 #
SERI/TR-215-1612 ..... N83-12786 #
SERI/TR-253-1450 ..... N83-12587 #
SERI/TR-255-1432 ..... N83-12588 #
SERI/TR-9079-1-T7 ..... N83-13021 #

SES-TD-82-014 ..... N83-12110 #

SGD-448-PT-2 ..... N83-13056 #

SM-A2-04322 ..... N83-12491* #

SM-K2-04356 ..... N83-12503* #

SOLAR/0010-82/07 ..... N83-12787 #
SOLAR/1027-82/14 ..... N83-12579 #
SOLAR/1060-82/14 ..... N83-12563 #
SOLAR/1109-82/14 ..... N83-12575 #
SOLAR/1115-82/14 ..... N83-12574 #
SOLAR/1116-82/14 ..... N83-12576 #
SOLAR/1117-82/14 ..... N83-12539 #
SOLAR/1118-82/14 ..... N83-12538 #
SOLAR/1120-82/14 ..... N83-12577 #
SOLAR/2122-82/14 ..... N83-12540 #
SOLAR/2125-82/14 ..... N83-12586 #

SR-K2-04313 ..... N83-12485* #
SR-K2-04336 ..... N83-12499* #

SR-L2-00750 ..... N83-12493* #

SR-P1-04090 ..... N83-12484* #
SR-P2-04266 ..... N83-12506* #
SR-P2-04326 ..... N83-12504* #

SR-T2-04371 ..... N83-12494* #

SR-1 ..... N83-12054 #
SR-1 ..... N83-13051 #
SR-9 ..... N83-12813 #
SRI-MP-82-063 ..... N83-12979 #

SRS-493 ..... N83-12474 #

SSS-R-82-5358 ..... N83-12697 #

STS-5 ..... N83-12134* #

SU-IPR-929 ..... N83-13049* #

SU-ORION-006 ..... N83-12931 #

SU-STAN-CS-82-892 ..... N83-12936 #

SU-TF-16 ..... N83-12373* #

SWRI-14-6522-VOL-1 ..... N83-12844 #
SWRI-14-6522-VOL-2 ..... N83-12845 #
SWRI-6800-299 ..... N83-12241 #

TN-22 ..... N83-12199 #
TN-170-VOL-2 ..... N83-12989 #
TN-173 ..... N83-12793 #

TOPEX-1 ..... N83-12789 #
TOPEX-3 ..... N83-12795 #

TO3-TZ20 ..... N83-12102* #

TR-ONR-8 ..... N83-12857 #

TR-2 ..... N83-12982 #
TR-2-82 ..... N83-12442 #
TR-6 ..... N83-12448 #
TR-7 ..... N83-12447 #
TR-8 ..... N83-12193 #
TR-9 ..... N83-12196 #
TR-9 ..... N83-12258 #
TR-10 ..... N83-12194 #
TR-10 ..... N83-12445 #
TR-10 ..... N83-12831 #
TR-11 ..... N83-12198 #
TR-11 ..... N83-12446 #
TR-12 ..... N83-12185 #
TR-13 ..... N83-12187 #
TR-14 ..... N83-12197 #
TR-15 ..... N83-12186 #
TR-16 ..... N83-12195 #
TR-21 ..... N83-13017 #
TR-34 ..... N83-12192 #
TR-67 ..... N83-12957 #
TR-68 ..... N83-12953 #
TR-69 ..... N83-12952 #
TR-70 ..... N83-12954 #
TR-71 ..... N83-12955 #
TR-72 ..... N83-12956 #
TR-82-1 ..... N83-12856 #
TR-82-01 ..... N83-12313 #
TR-82-22 ..... N83-12961 #
TR-82-27 ..... N83-12943 #
TR-106-12 ..... N83-13025 #
TR-111 ..... N83-12960 #

TRACOR-T82-AU-9054-U ..... N83-12944 #

TRW-37255-6001-UT-00-VOL-1 ..... N83-12144* #
TRW-37255-6002-UT-00-VOL-2 ..... N83-12145* #

UAG-70 ..... N83-13053 #

UCID-19339 ..... N83-12473 #
UCID-19422 ..... N83-13001 #
UCID-19478 ..... N83-13004 #
UCID-19479 ..... N83-12947 #
UCID-19483 ..... N83-12427 #
UCID-19548 ..... N83-12571 #

UCRL-15454 ..... N83-12836 #
UCRL-50400-VOL-22-REV-1 ..... N83-12203 #

UDR-TR-82-01 ..... N83-12095 #

UILU-ENG-81-2012 ..... N83-12474 #
UILU-ENG-82-1707 ..... N83-12946 #

UIUCDS-R-82-1086 ..... N83-12946 #

US-PATENT-APPL-SN-408575 ..... N83-12398* #
US-PATENT-APPL-SN-414107 ..... N83-12397* #
US-PATENT-APPL-SN-414237 ..... N83-12969* #
US-PATENT-APPL-SN-415878 ..... N83-12098* #
US-PATENT-APPL-SN-415879 ..... N83-12986* #
US-PATENT-APPL-SN-415880 ..... N83-12239* #
US-PATENT-APPL-SN-416413 ..... N83-12992* #
US-PATENT-APPL-SN-418133 ..... N83-12176* #
US-PATENT-APPL-SN-425202 ..... N83-12991* #

US-PATENT-APPL-SN-425204 ..... N83-12308* #
US-PATENT-APPL-SN-431421 ..... N83-12434* #
US-PATENT-APPL-SN-431886 ..... N83-12138* #
US-PATENT-APPL-SN-434085 ..... N83-12333* #
US-PATENT-APPL-SN-434672 ..... N83-12361* #
US-PATENT-APPL-SN-434674 ..... N83-12525* #
US-PATENT-APPL-SN-437912 ..... N83-12335* #
US-PATENT-APPL-SN-437913 ..... N83-12334* #
US-PATENT-APPL-SN-437914 ..... N83-12332* #
US-PATENT-APPL-SN-437917 ..... N83-12932* #

USAAEFA-80-17-1 ..... N83-12075 #

USAAVRADCOM-TR-82-A-8-VOL-2 ..... N83-12048* #
USAAVRADCOM-TR-82-D-9 ..... N83-12056 #

USAFA-TN-82-4 ..... N83-12053 #

USAFETAC/DS-78/007 ..... N83-12775 #
USAFETAC/DS-78/010 ..... N83-12780 #
USAFETAC/DS-79/025 ..... N83-12777 #
USAFETAC/DS-79/088 ..... N83-12766 #
USAFETAC/DS-79/089 ..... N83-12769 #
USAFETAC/DS-81/054 ..... N83-12766 #
USAFETAC/DS-81/055 ..... N83-12769 #
USAFETAC/DS-82/033 ..... N83-12767 #
USAFETAC/DS-82/034-PT-A-F ..... N83-12770 #
USAFETAC/DS-82/035 ..... N83-12775 #
USAFETAC/DS-82/036 ..... N83-12776 #
USAFETAC/DS-82/037 ..... N83-12780 #
USAFETAC/DS-82/038-PT-A-F ..... N83-12771 #
USAFETAC/DS-82/039-PT-A-F ..... N83-12772 #
USAFETAC/DS-82/040-PT-A-F ..... N83-12774 #
USAFETAC/DS-82/041-PT-A-F ..... N83-12773 #
USAFETAC/DS-82/042 ..... N83-12777 #

USAMBRDL-TR-8205 ..... N83-12656 #

USGS/WRD/CO-80/1 ..... N83-12519 #

USGS/WRD/HD-81/063 ..... N83-12519 #

UTSI-81-6 ..... N83-13005 #

VHTRC-82-R30 ..... N83-12284 #

VIP-E-81-33 ..... N83-12179 #

VKI-LS-1981-1-VOL-2 ..... N83-12362 #
VKI-LS-1981-2 ..... N83-12365 #
VKI-LS-1981-3 ..... N83-12408 #
VKI-LS-1981-5 ..... N83-12372 #
VKI-LS-1981-7 ..... N83-12260 #
VKI-LS-1981-8 ..... N83-12526 #

VPI-E-81-18 ..... N83-12050 #
VPI-E-82-29 ..... N83-12213* #

VSC-TR-82-20 ..... N83-12697 #

WAOENG-82-11 ..... N83-12549 #

WAPD-TM-1431 ..... N83-12225 #

WES-INSTRUCTION-K-82-7 ..... N83-12888 #

WHOI-81-69 ..... N83-12476 #

WMO-TN-176 ..... N83-12663 #

WMO-217 ..... N83-12800 #
WMO-240-REV ..... N83-12810* #
WMO-258 ..... N83-12481 #
WMO-519-VOL-1 ..... N83-12790 #
WMO-519-VOL-2 ..... N83-12791 #
WMO-542 ..... N83-12792 #
WMO-544-VOL-1-ANNEX ..... N83-12801 #
WMO-550-VOL-2 ..... N83-12989 #
WMO-559 ..... N83-12514 #
WMO-560 ..... N83-12797 #
WMO-562 ..... N83-12793 #
WMO-563 ..... N83-12599 #
WMO-565 ..... N83-12789 #
WMO-573 ..... N83-12795 #
WMO-580 ..... N83-12515 #
WMO-581 ..... N83-12662 #
WMO-582 ..... N83-12802 #
WMO-583 ..... N83-12663 #
WMO-584 ..... N83-12803 #
WMO-586 ..... N83-12805 #
WMO-587 ..... N83-12516 #
WMO-589 ..... N83-12809 #
WMO-592 ..... N83-12811 #
WMO-596 ..... N83-12736 #

WSMR-TR-81 ..... N83-12122 #

WSU-L2 ..... N83-13020 #

XAL-72760-AL ..... N83-12524* #

YM-12-04306 ..... N83-12483* #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983—381-564/303

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*'. from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business

Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

4 1 STAR. 830131 S01733U
UNIV OF MICHIGAN
GRADUATE LIBRARY
DOCUMENT UNIT SERIALS DIV
ANN HARBOR MI 48109

POSTMASTER: If Undeliverable (Section 158
Postal Manual) Do Not Retu

ection 158
Not Retu